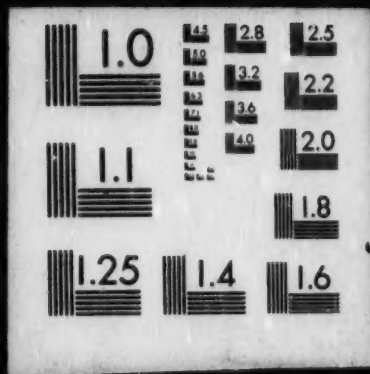


1 OF 2

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AIR POLLUTION ABSTRACTS

57510-58100



JUNE 1976
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Office of Air Quality Planning and Standards
Research Triangle Park, N. C. 27711

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VOLUME 7, NO. 6A

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Personal authors are arranged alphabetically. The names are presented last name first. When the author is a primary author, an asterisk precedes the Abstract Number.	

INTRODUCTION

This periodical is intended to inform personnel of the Environmental Protection Agency (EPA), and others who are also professionally interested in air pollution, of selected technical literature recently accessioned by the Air Pollution Technical Information Center (APTIC). For each accession, its Abstract Number, APTIC accession number, bibliographic citation, and abstract are given. Semiannual cumulative indexes to both subject and author are also sent to all recipients of this monthly publication.

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As another service, abstracts of all of the literature in APTIC (not just in a single issue of this periodical) on any subject related to air pollution will be provided free of charge upon request. APTIC can search information more recent than that in the current issue of this periodical because of the lapse of time entailed by editorial, make-up, and printing work. More than 1400 subject index terms are available for such searching ---more than those included in the subject index in each issue.

Acknowledgement is given to the Technical Publications Branch, Informational Services Division, Office of Administration, Research Triangle Park, N.C. for the make-up of the cover and for arrangement of printing and distribution.

Feedback from our users, including suggestions of articles, are always welcome.

APTIC Publications

- Air Pollution Aspects of Emission Sources: Primary Lead Production - A Bibliography with Abstracts*, June 1973, GPO No. EP 4.9:126, \$0.65.
- Air pollution Aspects of Emission Sources: Primary Copper Production - A Bibliography with Abstracts*, June 1973 GPO No. EP 4.9:125, \$0.70.
- Air Pollution Aspects of Emission Sources: Pulp and Paper Industry - A Bibliography with Abstracts*, March 1973, GPO No. EP 4.9:121, \$2.35.
- Air Pollution Aspects of Emission Sources: Primary Aluminum Production - A Bibliography with Abstracts*, June 1973, GPO No. EP 4.9:119, \$0.90.
- Mercury and Air Pollution: A Bibliography with Abstracts*, October 1972, GPO No. EP 4.9:114, \$1.25.
- Odors and Air Pollution: A Bibliography with Abstracts*, October 1972, GPO No. EP 4.9:113, \$3.00.
- Air Pollution Aspects of Emission Sources: Petroleum Refineries - A Bibliography With Abstracts*, July 1972, GPO No. EP 4.9:110, \$1.25.
- Air Pollution Aspects of Emission Sources: Iron and Steel Mills - A Bibliography With Abstracts*, May 1972, GPO No. EP 4.9:107, \$1.00.
- Air Pollution Aspects of Emission Sources: Boilers - A Bibliography With Abstracts*, May 1972, GPO No. EP 4.9:105, \$2.00.
- Hydrochloric Acid and Air Pollution: An Annotated Bibliography*, July 1971, GPO No. EP 4.9:100, \$0.55.
- Chlorine and Air Pollution: An Annotated Bibliography*, July 1971, GPO No. EP 4.9:99, \$0.55.
- Air Pollution Aspects of Emission Sources: Electric Power Production - A Bibliography With Abstracts*, May 1971, GPO No. EP 4.9:96, \$2.25.
- Air Pollution Aspects of Emission Sources: Cement Manufacturing - A Bibliography With Abstracts*, May 1971, GPO No. EP 4.9:95, \$0.50.
- Air Pollution Aspects of Emission Sources: Sulfuric Acid Manufacturing - A Bibliography With Abstracts*, May 1971, GPO No. EP 4.9:94, \$0.65.
- Air Pollution Aspects of Emission Sources: Nitric Acid Manufacturing - A Bibliography With Abstracts*, May 1971, GPO No. EP 4.9:93, \$0.45.
- Air Pollution Aspects of Emission Sources: Municipal Incineration - A Bibliography With Abstracts*, May 1971, GPO No. EP 4.9:92, \$1.00.
- Photochemical Oxidants and Air Pollution: An Annotated Bibliography (2 Volumes)*, March 1971, GPO No. EP 4.9:88, \$6.25.
- Beryllium and Air Pollution: An Annotated Bibliography*, February 1971, GPO No. EP 4.9:83, \$0.40.
- Asbestos and Air Pollution: An Annotated Bibliography*, February 1971, GPO No. EP 4.9:82, \$0.50.
- Municipal Incineration: A Review of Literature*, June 1971, GPO No. EP 4.9:79, \$1.00.
- Hydrocarbons and Air Pollution: An Annotated Bibliography (2 Volumes)*, October 1970, GPO No. HE 20.1309:75, \$5.00.

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SUBJECT FIELDS AND SCOPE NOTES

1. EMISSION SOURCES

Information pertaining to an industry, process, or material associated with air pollution. Documents in this category are concerned primarily with characteristics of a specific class of emission sources including types, rates, industries; secondary coverage may include effects, control methods, etc.

2. CONTROL METHODS

Includes equipment and both specific source control and general abatement efforts. Included are documents describing the operating principles, design, operation, efficiency, etc., of equipment and methods of removing pollutants. The scope of the document can vary from a device for a specific source to an approach applicable to an entire industry--e.g., automobiles.

3. MEASUREMENT METHODS

Includes equipment as well as methods. Confined to development testing and evaluation of pollutant determination methods (sampling, analytical, monitoring) and equipment, as such. Data obtained by use of methods in specific applications are placed in the applicable subject categories.

4. AIR QUALITY MEASUREMENTS

Pollution measurements in the ambient air, generally related to specific geographical locations, such as area surveys. Also includes general reviews of area situations and emission source inventories.

5. ATMOSPHERIC INTERACTION

All chemical and physical phenomena occurring in the atmosphere. Included is material on dispersion, air pollution forecasts, meteorological effects, topographical effects, photochemical reactions in the atmosphere, etc. Laboratory studies of photochemical reactions are assigned to Basic Science and Technology.

6. BASIC SCIENCE AND TECHNOLOGY

General discussions or data compilations for the basic physical and chemical properties of pollutants. Theoretical and laboratory studies on related chemical and biological reactions and mechanisms. Mass transfer and other basic knowledge related to process engineering applications in emission control or abatement. Excludes photochemical studies in the atmosphere and biochemical studies related to effects of air pollution.

7. EFFECTS--HUMAN HEALTH

Covers medical and epidemiological studies; biological effects other than those on plants and livestock produced by air pollutants; laboratory animal experiments.

8. EFFECTS--PLANTS AND LIVESTOCK

Effects on vegetation--crops, trees, other plants--and on livestock as distinguished from laboratory experimental animals.

9. EFFECTS--MATERIALS

Deterioration, corrosion, etc., of physical materials, buildings, and structures.

10. ECONOMIC ASPECTS

Economic implications of air pollution and its control, e.g., economic losses from pollution damage, and costs of control programs or equipment in general.

11. STANDARDS AND CRITERIA

Recommended or adopted guides, criteria and standards for allowable emission limits or pollutant concentrations, air quality, equipment characteristics, and fuels.

12. LEGAL AND ADMINISTRATIVE

Legal aspects include legislation, ordinances, rules, litigation, hearings, decisions, etc. Administration covers administrative and miscellaneous information concerning control agencies and control and research programs. Typical topics are personnel, budgets, contractual activities and program descriptions.

13. SOCIAL ASPECTS

Sociological and psychological aspects such as social attitudes public opinion studies, public relations, and public information.

14. GENERAL AND MISCELLANEOUS

Reviews of general problems, trends and background. Documents not assignable to other categories.

ABSTRACT BULLETIN

EMISSION SOURCES

1976

57510

APTIC NO. 83549

Anderton, D. and V. K. Duggal

DIESEL ENGINE EMISSIONS AND NOISE. *J. Inst. Fuel*, 49(398):20-25, March 1976. 9 refs. (Presented at the Institute of Fuel/ISVR Symposium on Performance or Pollution, Southampton, England, Jan. 1975.)

Diesel engines (100-350 bhp) were assessed for combustion noise, overall noise, smoke, and pollutant gases (carbon monoxide, nitric oxide, and hydrocarbons) at the same test bed conditions. Turbocharging a four stroke naturally aspirated diesel engine reduces combustion noise, CO, specific fuel consumption, smoke, and hydrocarbons emissions. These reductions are obtained at the same time as an increase in power output. The exhaust NO levels are not significantly affected at the injection timings used. The specific emissions/l capacity increases as the engine swept volume is decreased. (Author abstract modified)

57511

APTIC NO. 84413

Bartosh, C. Patrick, David B. Cabe, and Michael A. Haecker

AIR QUALITY IMPACTS OF THE FEA FUEL CONVERSION PROGRAM. *Preprint*, 15p., 1976. 4 refs. (Presented at the Air Quality Management in the Electric Power Industry Conference, Jan. 28-30, 1976.)

The methods for determining the air quality impacts of the Federal Energy Administration conversion program is presented. Steady state Gaussian dispersion models were used to determine the contribution of 39 power plant emissions to the ambient air quality. Concentrations of sulfur dioxide and particulates were calculated for averaging times specified in the Federal primary ambient air quality standards to and for averaging times specified in applicable state ambient air quality standards. Sulfur dioxide and particulate emission rates were determined by applying the appropriate AP-42 emission factor to the sulfur and ash contents of the fuel and the tons or gallons of fuel burned.

57512

APTIC NO. 80545

Bombaugh, K. J., E. C. Cavanaugh, J. C. Dickerman, S. L. Keil, T. P. Nelson, M. L. Owen, and D. D. Rosebrook

SAMPLING AND ANALYTICAL STRATEGIES FOR COMPOUNDS IN PETROLEUM REFINERY STREAMS. VOLUME II. PROCESS ANALYSIS OF PETROLEUM REFINERY STREAMS (FINAL REPORT). *Radian Corp., Austin, Tex., Environmental Protection Agency Contract 68-02-1882, Task 32, Program Element 1AB015; ROAP 21AFH-025, Rept. EPA-600/2-76-012b, 192p., Jan. 1976. 93 refs.*

An attempt was made to determine from available literature and through engineering analysis the potentially hazardous components in five selected effluents from a typical refinery. The streams are typical major contributors to the total refinery emissions and represent different types of refinery effluents: fugitive atmospheric emissions from atmospheric crude distillation, aqueous condensate from the atmospheric crude still, effluent water from the separator, tail gas from the sulfur

recovery unit, and atmospheric emissions from the fluid catalytic cracking generator. A literature survey was made to determine components in the refinery streams and toxicity data on the components. The streams were examined for processing characteristics which can be used to determine the fate of components in the effluent streams. The compositions of the selected refinery streams are estimated. Lists of hazardous components were used in the development of sampling and analytical strategy. The method for describing the fugitive emissions from the atmospheric still involves simulating the losses by analyzing product streams from the column and by defining emission rates at points where emission losses occur. This method provides a means of identifying potentially hazardous emissions at their sources, where sampling and analysis are simpler. It is also less costly than the direct fugitive emission sampling methods. A discussion of crude oil composition is presented. Complete and well-documented stream analyses for crude oil are available from the literature. (Author abstract modified)

57513

APTIC NO. 82548

Fennelly, Paul F.

THE ORIGIN AND INFLUENCE OF AIRBORNE PARTICULATES. *Am. Scientist*, 64(1):46-56, Jan.-Feb. 1976. 28 refs.

The origin and influence of airborne particulates are discussed. Particulates are usually characterized as primary or secondary. Primary particulates, 1-20 micron in size, are those injected directly into the atmosphere by chemical or physical processes. Secondary particulates are produced as a result of chemical reactions that take place in the atmosphere. They are relatively smaller and can be generally classified chemically as sulfates, nitrates, and hydrocarbons. Air quality standards are exceeded fairly uniformly across the nation, even in rural areas, despite a general national decline in the total suspended particulate levels during the period 1970-1973, when the legal controls were first put into effect. Primary particulates come from extremely varied sources ranging from those in the industrial sector to those in nature. The chemical composition varies with the type of source. Secondary particulates can initiate in the gas phase or as a result of reactions between gases and already existing particulates. They are a prime component of urban smog.

57514

APTIC NO. 81878

Herling, Robert J.

DEVELOPMENT OF SPECIFICATIONS FOR A MOTOR-CYCLE DYNAMOMETER AND MOTORCYCLE COOLING SYSTEM: VOLUME II - SPECIFICATIONS (FINAL REPORT). *Olson Labs., Inc., Anaheim, Calif., Office of Air and Waste Management Contract 68-03-2141, Program Element 2-AB-130, Rept. EPA-460/3-76-004-b, 40p., Feb. 1976. 8 refs.*

Specifications for a motorcycle dynamometer and motorcycle cooling system for use in motorcycle exhaust emission certification programs are presented. The specifications are divided into performance, design, and procurement categories. The design specifications elaborate on the performance specifications including aspects necessary for interfacing with existing Environmental Protection Agency equipment at the Mobile Vehicle Emissions Laboratory in Ann Arbor. The procurement specifications describe requirements for product assurance,

warranty, maintenance, and acceptance. The specifications do not require the incorporation of any components for which there is only a single manufacturer or distributor; rather, they are designed to enable dynamometers to be built by various manufacturers while ensuring that the systems provide equivalent performance.

57515

APTIC NO. 84564

Hirata, H. and H. Takenaga

PRESENT STATE OF HEAVY METAL POLLUTION OF AGRICULTURAL FIELDS AROUND THE ANNAKA REFINERY OF TOHOEN COMPANY BY ITS EXHAUST. (Tohoen Annaka seirensyo shuben noch no haien ni yoru jukinzoku osen genkyo). Text in Japanese. Preprint, General Research Society for Environmental Science, Japan, p. 14-15, 1976. (Presented at the Environmental Science Meeting, 2nd, Tokyo, Japan, June 4, 1976.)

Heavy metals in the dust fall from the exhaust of Annaka refinery of the Toho Aen (zinc) Co. have been determined since Autumn of 1971. The refinery has completed nationally ordered improvements of the exhaust and waste water cleaning facilities, and passed a general inspection in June 1971. Cadmium fallen on agricultural fields around the refinery (500 m in radius) measured 1.09 kg/sq km/mo from July 7 to Oct. 25 1973, and 0.66 kg/sq km/mo from Nov. 9, 1974 to June 24, 1975. The simple average of the cadmium content of the surface soil (10 cm layer) was 0.11 ppm/yr. The cadmium content of the soil amounts of over 1 ppm for 10 years, and is the cause of cadmium-polluted rice grains. As for zinc, the simple average amount of zinc fall was 87 kg/sq km/mo, which should make the zinc content of the surface over 100 ppm for 10 yr. The exhaust-treating apparatus of the refinery should be further improved to give concentrations of zinc and cadmium of at the most one tenth of the present concentrations.

57516

APTIC NO. 83571

Khan, Mahmood A., Ramu M. Rao, and Arthur F. Novak

POLYCHLORINATED BIPHENYLS (PCBS) IN FOOD.

Crit. Rev. Food Sci. Nutr., 7(2):103-145, 1976. 85 refs.

The sources of polychlorinated biphenyls (PCB) in the environment are discussed. There are numerous ways by which PCBs can get into the ecosystem. Incineration is one method, and certain products which contain PCBs as plasticizers, spent ballasts from fluorescent light fixtures, and objects coated with PCB formulated coatings find their way into disposal systems and to the incinerator for burning. Direct spills or leakages from heat exchange systems is another source of PCBs. Eventually they do not burn but are vaporized and carried into the atmosphere, where they collect on the particulate matter and subsequently are returned to the earth's surface. An important source of contamination originates directly from the point of manufacture and the plants where PCBs are processed into other products. Plant ventilation and exhaust systems allow them to escape into the atmosphere. The incidence of PCBs is highest in industrialized and urbanized areas.

57517

APTIC NO. 83000

Kubota, H., W. H. Griest, and M. R. Guerin

DETERMINATION OF CARCINOGENS IN TOBACCO SMOKE AND COAL DERIVED SAMPLES -- TRACE POLYNUCLEAR AROMATIC HYDROCARBONS.

Preprint, Oak Ridge National Lab., Oak Ridge, Tenn., Tobacco Smoke Research Program, 17p., 1976. 10 refs.

A conventional assay for the polynuclear aromatic hydrocarbons (PAH's) benzo(a)pyrene (BaP) and benz(a)anthracene (BaA) and a multiPAH profiling assay were applied to smoke and coal-derived materials. A PAH enriched fraction was prepared for the first assay using florisil column chromatography following serial extractions with cyclohexane and dimethylsulfoxide. The PAH fraction was purified and further fractionated by alumina column and acetate cellulose column

or paper chromatography prior to gas chromatographic or fluorimetric measurement of BaP and BaA. Benzo(a)pyrene, a highly active tumor initiator, was present in the coal liquefaction product to the extent of 40 ppm, about 20 times the level normally found in tobacco smoke condensate. High resolution gas chromatographic analysis of the entire PAH fraction was used to generate a characteristic profile in the second assay. Differences were apparent in the profiles of tobacco smoke and coal-derived materials, and preliminary estimates were made of the concentrations. Of 29 PAH's in two coal products and two preproduct samples. The high levels of BaP, the methylnaphthalenes, which are tumor promoters, and the possible presence of cocarcinogens such as pyrene among the unidentified components of the coal products may contribute significantly to the high carcinogenic activity due to one of these products. The similarity in composition of other coal-derived materials suggests that they may possess considerable carcinogenic activity. (Author abstract modified)

57518

APTIC NO. 84187

Lauer, Karl-Heinz

MEASUREMENTS OF THE OXIDES OF NITROGEN IN A GAS TURBINE OPERATED WITH NATURAL GAS AND EXTRA LIGHT FUEL OIL. (Stickoxidmessungen an einer Gasturbine bei Betrieb mit Erdgas und Heizöl EL). Text in German. *Gas Wasserfach, Gas/Erdgas (Munich)*, 117(2):77-79, 1976. 11 refs.

The nitrogen oxides emissions of gas turbines were determined by a chemiluminescence detector (Thermo Electron 12A) with a molybdenum converter, which determined both nitric oxide and total NOx to give nitrogen dioxide by difference. The analysis showed that while starting, the exhaust gases of the turbines contained mainly NO₂, and the production of NO developed with a rise in temperature. Also, the ratio of NO to NO₂ increased as the generating capacity of the turbine increased, and the oil-driven turbines produced more NOx than the gas-driven turbines. Thus, the oil-operated turbine of 25 MW capacity produced 475 ppm NOx while the gas-operated one of the same capacity produced only 400 ppm NOx. Similarly, the oil-fired turbine of 55 MW capacity emitted exhaust gases containing almost 1200 ppm NOx while the gas-fired one of the same capacity emitted gases containing almost 800 ppm NOx.

57519

APTIC NO. 83759

Liestmann, Wulf Dietrich

PRODUCTION OF SPONGE IRON WITH RHENISH LIGNITE IN THE ROTARY KILN. (Herstellung von Eisenschwamm mit rheinischer Braunkohle im Drehrohrofen). Text in German. *Stahl Eisen (Duesseldorf)*, 96(3):97-105, 1976. 12 refs.

In a joint large-scale test by several companies, 2800 tons of sponge iron were produced by direct reduction in a 65,000 ton annual capacity rotary kiln in Brazil, using lignite briquettes from the Rhenish district of Germany as the reducing agent, and iron oxide pellets containing 66% iron and 6% fines. Rhenish lignite is in plentiful supply and is mined by highly-mechanized methods, but its energy content is low. The Brazilian furnace is 50 m long, 3.6 m in diameter, and has a slope of 1.5%. Material was fed to the furnace at the rate of 8.5-9.5 tons/hr for briquettes and 10-12 tons/hr for iron oxide pellets. The degree of metallization is approximately 95%. The temperature of the reduction zone is 1000-1050 C. Lignite does not require as high a temperature to reduce iron oxides as other forms of coal do. A non-uniform supply ratio of lignite and iron oxide pellets does not damage sponge iron quality. At a fixed carbon-iron ratio of 0.44, 71% of the fixed carbon is used for reduction, the rest is lost. Sponge iron, on leaving the kiln, is classified by size, and also into magnetic and non-magnetic fractions. The furnace output contains 95% magnetic and 5% non-magnetic material. The magnetic portion is 98.5% sponge iron. The oversize particles are combined with fines and taken back into the process. Energy consumption is 5.34

EMISSION SOURCES

57525

Gcal/ton of sponge iron, but it is estimated that in a large scale plant this could be reduced to 4.75 Gcal/ton. While this is larger than the 3.2 Gcal/ton for a reduction process using natural gas, the present cost of lignite energy is only about 2/3 that of natural gas energy, so the total cost per ton by the two methods is about the same, and is slightly less than current scrap iron prices. One thousand tons of the sponge iron were transported back to Germany in an ocean freighter. Oxidation during travel was not excessive, and the increase in fine particles under 3 mm was about 3%.

57520

APTIC NO. 83966

Moll, Walter L. H.

SPRAY DAMAGES IN THE SKY AND ON THE EARTH. (Spray-schaden am Himmel und auf Erden). Text in German. *Technische Umweltmag.*, (1):16-17, 1976. 8 refs.

The hazards and potential damage due to the use of sprays containing chloro-fluorohydrocarbons as propellant gases are described. The compounds do not disintegrate in the lower atmosphere. Their molecules are not water-soluble and do not return to earth in rain or snow. Their total atmospheric concentration increases steadily. The heavy molecules diffuse in the stratosphere (20-70 km in height). Intense solar radiation decomposes the chloro-fluorohydrocarbons, splitting off 1 or 2 Cl(-) ions from each molecule. In a certain reaction, 1 single Cl(-) ion can destroy thousands of ozone molecules. Ultraviolet rays normally absorbed by the O3-layer might intensify on earth with disastrous biological effects to men, animals, and plants. It is calculated that decreasing O3-concentrations by 50% would cause a considerable increase of skin cancer in the U. S. Stratospheric ozone concentration fluctuates and could also be reduced by nitrous exhausts from supersonic aircraft and atomic bomb explosions. Growing chloro-fluorohydrocarbon concentrations (as in the case of mounting CO2 concentrations) could absorb heat radiation in the atmosphere, resulting in a greenhouse effect with incisive climatic changes on earth. The spray cans applying these gases have an internal pressure of 3 atm, and can easily explode when exposed to heat. They are a threat to children playing with them. Urban incinerators have been endangered because of them. Inhalation of the spray gas could have a lethal effect over a period of 10-20 yr. Cardiac rhythm may be disturbed. A higher incidence of cancer and liver/kidney diseases has already been observed in men and women. Hair dyes applied by means of sprays are likely to be carcinogenic and mutagenic. To prevent ozone layer destruction and other harmful consequences, the introduction of small plastic pumps is urgently recommended to replace gas sprays.

57521

APTIC NO. 82723

Naeve, Stephen W. and J. L. Blau

RECENT EXPERIENCES IN POWER PLANT CONTINUOUS FLUE GAS MONITORING. Preprint, Houston Lighting and Power Co., Houston, Tex., 23p., 1976. 4 refs. (Presented at the Air Pollution and Industrial Hygiene Conference, 12th, Air Quality Management in the Electric Power Industry, Austin, Tex., Jan. 28-30, 1976.)

Experience with the installation of continuous flue gas monitoring systems at a steam power plant is reported. The installation includes both extractive and in situ systems for the monitoring of nitrogen oxides, sulfur dioxide, plume opacity, oxygen, and carbon monoxide. Installation and operating requirements associated with probe and filter assemblies, probe blow-back, heated sample lines, flow control rotameters, membrane filter assemblies, sample pumps, condensers or dryers, and chemical analyzers are reviewed. Calibration procedures are also outlined. The equipment and installation cost of a multiple probe extractive continuous monitoring system capable of measuring flue gas CO, O2, SO2, and NOx is about \$65,000. In situ instrumentation for the monitoring of CO, SO2, and nitric oxide costs approximately \$35,000 for a single stack. Installation costs may vary from \$3000-\$5000. Opacity monitors typically cost approximately \$7000.

57522

APTIC NO. 83039

Sanker, Philip E., Laurance L. Oden, and Thomas F. Campbell

REDUCTION OF ZINC SULFIDE WITH IRON. Bureau of Mines, Albany, Oreg., Albany Metallurgy Research Center, Bureau of Mines RI 8114, 16p., 1976. 7 refs.

Small scale batch and semicontinuous tests on the reduction of zinc sulfide with iron over a temperature range of 1000-1400 C were conducted as part of an effort to develop an improved method for the extraction of zinc. Batch tests revealed that a temperature of at least 1300 C with a 1:1 mole ratio of iron to zinc sulfide is needed for good zinc recovery. Tests with a zinc mine works concentrate were conducted using a reductant that consisted of electrolytic iron chips wherein 5 and 20% of the iron was replaced with iron oxide powder. Sulfur dioxide was not detected in the condenser off gas when up to 20% of the iron reductant was replaced with iron oxide, the temperature was 1340 C, the Fe:ZnS ratio set equal to 1, and the holding time kept at 30 min. The absence of SO2 in the exit off gas was probably due to the back reaction of SO2 with zinc vapor.

57523

APTIC NO. 81860

Scheil, George W.

SOURCE TEST TRICHLOROETHYLENE DEGREASER ADSORBER AT THE VIC MANUFACTURING PLANT (FINAL REPORT). Midwest Research Inst., Kansas City, Mo., Office of Air and Waste Management Contract 68-02-1403, Proj. 3927-C(16), Task 16, Rept. 76-DEG-1, 84p., Feb. 11, 1976. 3 refs.

The efficiency of a double-bed carbon adsorption system used for controlling trichloroethylene solvent emissions from a degreaser at the Vic Manufacturing Company in Minneapolis, Minnesota was determined. Large inlet level variations made the determination of bed efficiency nearly impossible. Over the first 8 hr of operation, however, the average bed efficiency was 95-97% for an average inlet level of 104 ppm. The efficiency was lower for the second cycle, probably as a result of incomplete stripping after the bed reached saturation. Outlet concentration of trichloroethylene was independent of the inlet concentration and was a function of the quantity of solvent present in the bed.

57524

APTIC NO. 83298

Schloemer, K.

INCINERATION OF ALKALINE WASTE WATER. (Verbrennung alkalischer Abwaessers). Text in German. *Chem.-Ing.-Tech.*, 48(1):41-44, 1976.

An economical and technically simple method was developed for the incineration of an alkaline wastewater containing 35% solid matter, including 25% organic substances, 15% organic carbon, 9% sodium, and 3% free sodium hydroxide. Incineration is by a two-stage incinerator, with the first stage used to generate hot flue gases at 1000-1600 C, and a second stage in which the wastewater is brought into contact with the hot flue gases for incineration. The hot flue gases are then directly quenched with water to 90% whereby 90-95% of the soda is removed from the gases. The soda content is further reduced to 80 mg/cu m in venturi scrubbers. The incinerator has been operating satisfactorily for 15 months.

57525

APTIC NO. 83047

Sebastian, Frank P.

SLUDGE INCINERATION SYSTEMS FOR PURIFICATION AND RESOURCE RECOVERY. Preprint, Envirotech Corp., Menlo Park, Calif., 33p., 1976. 8 refs. (Presented at the Mid-Atlantic Industrial Waste Conference, 8th, Newark, Del., Jan. 12-13, 1976.)

Sludge incineration and reclamation systems for sewage treatment plants are reviewed, with particular emphasis on the use multiple hearth systems. The benefits of sludge incineration/reclamation systems include: the recovery of resources

such as carbon dioxide and lime, the reclamation of energy via closed loop systems, the production of quasi-fertilizer ash products, the decomposition of pesticides and polychlorinated biphenyls, and the attainment of air quality standards. The per capita air quality impact of hydrocarbon, carbon monoxide, and nitrogen oxide emissions resulting from sludge incineration is far less (approximately 1/100) than that associated with automobile emissions. Tests conducted on multiple hearth installations also demonstrate low levels of sulfur dioxide and particulates when appropriate controls are used.

57526

APTIC NO. 82477

Stewart, D. B., E. D. Dainty, and J. P. Mogan

DIESEL EMISSIONS WITH RESPECT TO THE MINE ENVIRONMENT. *Can. Mining Met. Bull. (Montreal)*, 69(765):85-89, Jan. 1976. 2 refs. (Presented at the Professional Development Seminary on the Mine Environment, Montreal, Quebec, Oct. 1975.)

The composition of diesel engine exhaust products is described. The combustion chamber of a diesel engine, derated for underground mine usage, contains air and atomized diesel fuel in ratios of between 100:1 (idle) and 20:1 (full load) by weight. Diesel fuel consists of 85-86% (by weight) carbon, 13-14% hydrogen, and 0.05-0.7% S. The concentration of carbon dioxide, water, and sulfur dioxide found in the exhaust from derated diesel engines are dependent on the fuel to air ratio in the combustion chamber and the C, H₂, and S contents of the fuel. Most of the nitric oxide found in diesel engine exhaust is produced in the lean flame region, where high combustion temperatures are reached and readily available excess oxygen is present. Some nitrogen dioxide is found in the exhaust during low load operation. The various exhaust treatment systems in use and under test are detailed, and ventilation requirements for underground mining are described.

57527

APTIC NO. 81898

Surprenant, Norman, Robert Hall, and Leonard M. Seale

PRELIMINARY EMISSIONS ASSESSMENT OF CONVENTIONAL STATIONARY COMBUSTION SYSTEMS. VOLUME I - EXECUTIVE SUMMARY (FINAL REPORT). *GCA Corp., Bedford, Mass., GCA/Technology Div., Environmental Protection Agency Contract 68-02-1316, Program Element EHB525, ROAP AAU-002, Task 11, Rept. EPA-600/2-76-046a, 85p., March 1976. 10 refs.*

The results of a preliminary emissions assessment of air, water, and solid waste pollutants produced by conventional stationary combustion systems are presented. Emission estimates are presented for four principal source categories: utilities (electric generation); industrial (steam generation, space heating, and stationary engines); commercial/institutional (space heating and stationary engines); and residential (space heating). Major air pollutants for which emission estimates are derived include: particulates, sulfur oxides, nitrogen oxides, hydrocarbons, carbon monoxide; trace elements, benzene soluble organics, polynuclear compounds, halogenated hydrocarbons, and radioactive elements. Pollutant emissions from applicable unit operations are summarized for each of 56 source classifications, using a uniform combustion source classification system. (Author abstract modified)

57528

APTIC NO. 81536

Wachters, L. H. J.

EMISSION INVENTORY OF ENVIRONMENTAL POLLUTANTS. *TNO Proj. 75-10, 1976 (?)*. 1 ref. Translated from Dutch, 20p.

The development of an emissions inventory for air and water pollutants as well as hard-to-process waste products in the Netherlands is described. The inventory includes emissions from both industrial and non-industrial sources and distinguishes between emissions requiring individual recording and those suitable for collective inventorying. A system based on one developed in Germany for air pollution is used for the

AIR POLLUTION ABSTRACTS, JUNE 1976

storage of individually inventoried emissions, while a completely new system developed in Holland is being used for collective inventorying. The data are stored on memory discs or magnetic tape. Good cooperation is being obtained from both the industrial and non-industrial sectors to date.

57529

APTIC NO. 81537

Wachters, L. H. J.

EFFLUENTS REGISTRY MANUAL, PART I. INSTRUCTIONS FOR THE INDIVIDUAL RECORDING OF EFFLUENTS INTO THE OPEN AIR AND WATER.

(Handleiding Emmissieregistratie, Deel I. Instructies voor de Individuele Registratie van Lucht- en Wateremissie). Preprint, Centraal Technisch Instituut TNO (Netherlands), 140p. 1976 (?). Translated from Dutch, 161p.

A system for recording air and water pollution effluents is described. The recording system uses seven components: the plant component which records data on the location, nature, and magnitude of installations capable of causing environmental pollution; the matter component which records data on the properties of pollutants released to the air and water; the installation and apparatus component which records data on the nature, capacity, and location of the installations and apparatus which produce pollution; two source components which record data on the nature, measurements, and locations of pollution sources; and two effluent components which record data on the nature, magnitude, length of time, and frequency of effluents leading to air and water pollution. The recording system is arranged so that installations and sources can be independently treated, i.e., a source is not included in an individual installation but operates as an independent entity within the plant. Data on effluents, sources, installations, and pollutants are divided into categories for easy analysis by computer.

57530

APTIC NO. 81889

Weisenberg, I. J. and J. C. Serne

DESIGN AND OPERATING PARAMETERS FOR EMISSION CONTROL STUDIES: WHITE PINE COPPER SMELTER (FINAL REPORT). *Pacific Environmental Services, Inc., Santa Monica, Calif., Environmental Protection Agency Contract 68-02-1405, Program Element 1AB013, ROAP 21ADC-061, Task 5, Rept. EPA-600/2-76-036a, 37p., Feb. 1976. 3 refs.*

Design and operating data for a specific copper smelter are presented, with particular emphasis on lean sulfur dioxide streams that currently are not being captured. Existing control equipment consists of an electrostatic precipitator to control particulate emissions from the reverberatory furnaces and a two-stage wet scrubber for controlling particulates from the rotary dryer. The actual efficiency of the former control device is about 90%, and the guaranteed collection efficiency of the latter device is 99.5%. Sulfur dioxide is emitted at a rate of 2822 lb/hr from the precipitator controlling the reverberatory furnaces for a gas volume flow rate of 166,900 standard cu ft/min. The SO₂ emission factor for converter flue gas is 48,222 lb/hr for a gas volume flow rate of 106,855 standard cu ft/min. The SO₂ concentration in the reverberatory furnace off gas varies significantly with time as a result of the variation in time required for the decomposition or reaction of various sulfide ores charged to the furnace. Although no data are available concerning this point, it is recommended that it be considered for control system design.

57531

APTIC NO. 81890

Weisenberg, I. J. and J. C. Serne

DESIGN AND OPERATING PARAMETERS FOR EMISSION CONTROL STUDIES: KENNECOTT, HAYDEN, COPPER SMELTER (FINAL REPORT). *Pacific Environmental Services, Inc., Santa Monica, Calif., Environmental Protection Agency Contract 68-02-1405, Program Element 1AB013, ROAP 21ADC-061, Task 5, Rept. EPA-600/2-76-036b, 51p., Feb. 1976. 8 refs.*

EMISSION SOURCES

57536

Design and operating data for a specific copper smelter are presented, with particular emphasis on lean sulfur dioxide streams that currently are not being captured. Fluo-solids reactor and converter gases are treated for both particulate and SO₂ removal, while reverberatory furnace gases are treated for particulate removal only. Fluo-solids reactor gases pass through two parallel sets of primary and secondary cyclones with a dust collection efficiency of 96.6%. The gases are then cooled and enter an acid plant for SO₂ removal. Reverberatory furnace gases are treated by an electrostatic precipitator. The acid plant utilizes two Peabody towers and a venturi scrubber and achieves an SO₂ conversion efficiency of from 96-99%. The SO₂ concentration in the reverberatory furnace off gas varies significantly with time as a result of the variation in time required for the decomposition or reaction of various sulfide ores charged to the furnace. Although no data are presently available for SO₂ concentration in the off gas, this stream is recommended for control system design.

57532

APTIC NO. 81891

Weisenberg, I. J. and J. C. Serne

DESIGN AND OPERATING PARAMETERS FOR EMISSION CONTROL STUDIES: KENNECOTT, MCGILL, COPPER SMELTER (FINAL REPORT). *Pacific Environmental Services, Inc., Santa Monica, Calif., Environmental Protection Agency Contract 68-02-1405, Program Element 1AB013, ROAP 21ADC-061, Task 5, Rept. EPA-600/2-76-036c, 32p., Feb. 1976.*

Design and operating data for a specific copper smelter are presented, with particular emphasis on lean sulfur dioxide streams that are currently not being controlled. The major uncontrolled sources of SO₂ at the smelter are reverberatory furnaces and converters. The installation of a 500-ton/day sulfuric acid plant for the capture of a major portion of the sulfur emitted by the converters is in progress. The present control equipment includes multiclones for the control of particulates from converters and a precipitator for particulate control on the reverberatory furnaces. Converter gases to be processed in the acid plant will be pretreated in wet scrubbers. The smelter is currently emitting 175,000 tons/yr of SO₂. (Author summary modified)

57533

APTIC NO. 81892

Weisenberg, I. J. and J. C. Serne

DESIGN AND OPERATING PARAMETERS FOR EMISSION CONTROL STUDIES: KENNECOTT, HURLEY, COPPER SMELTER (FINAL REPORT). *Pacific Environmental Services, Inc., Santa Monica, Calif., Environmental Protection Agency Contract 68-02-1405, Program Element 1AB013, ROAP 21ADC-061, Task 5, Rept. EPA-600/2-76-036d, 26p., Feb. 1976. 5 refs.*

Design and operating data for a specific copper smelter are presented, with particular emphasis on lean sulfur dioxide streams that currently are not controlled. The major uncontrolled source of SO₂ and particulate matter at the smelter is the reverberatory furnace. Approximately 88,330 tons/yr of SO₂ and 6833 tons/yr of particulate matter are emitted from this source. There appears to be sufficient space and utility availability for the installation of additional control equipment. The existing pollution control equipment consists of multicyclones, rotocones, and cyclones for the crushing and screening operations as well as for the lime kiln. About 40% of the reverberatory furnace off gas passes through a precipitator for particulate control. The gases from the converters are passed to a double contact sulfuric acid plant to control SO₂ and are conditioned before entering the plant by passage through precipitators and scrubbers for particulate and temperature control. (Author summary modified)

57534

APTIC NO. 81893

Weisenberg, I. J. and J. C. Serne

DESIGN AND OPERATING PARAMETERS FOR EMISSION CONTROL STUDIES: MAGMA, SAN MANUEL,

COPPER SMELTER (FINAL REPORT). *Pacific Environmental Services, Inc., Santa Monica, Calif., Environmental Protection Agency Contract 68-02-1405, Program Element 1AB013, ROAP 21ADC-061, Task 5, Rept. EPA-600/2-76-036e, 20p., Feb. 1976. 5 refs.*

Design and operating data for a specific copper smelter are presented, with particular emphasis on lean sulfur dioxide streams that currently are not being controlled. The major uncontrolled sources of SO₂ at the smelter are three reverberatory furnaces which emit approximately 92,000 tons/yr of SO₂ and 570 tons/yr of particulate matter. Existing pollution control equipment consists of electrostatic precipitators for cleaning off gases from the reverberatory furnaces and the converters. A 2400-ton/day single contact sulfuric acid plant has been recently put into operation for collecting SO₂ from the converter off gases. (Author summary modified)

57535

APTIC NO. 81894

Weisenberg, I. J. and J. C. Serne

DESIGN AND OPERATING PARAMETERS FOR EMISSION CONTROL STUDIES: PHELPS DODGE, AJO, COPPER SMELTER (FINAL REPORT). *Pacific Environmental Services, Inc., Santa Monica, Calif., Environmental Protection Agency Contract 68-02-1405, Program Element 1AB013, ROAP 21ADC-061, Task 5, Rept. EPA-600/2-76-036f, 72p., Feb. 1976. 6 refs.*

Design and operating data for a specific copper smelter are presented, with particular emphasis on the control of lean sulfur dioxide streams. The primary sources of SO₂ are the reverberatory furnaces and the converters. Major control equipment consists of an electrostatic precipitator for dust collection from the reverberatory furnace and converter gases along with a 600-ton/day single contact acid plant and a dimethylaniline absorption unit for SO₂ control. The latter control unit is currently in the start-up phase. Reverberatory furnace gases are to be treated in the DMA absorption plant for SO₂ removal or discharged directly to the main stack following dust collection. The converter off gases, following dust collection, are treated in either the single contact acid plant or the DMA absorption plant. An average of 10 tons/day of sulfur (20 tons/day of SO₂) are discharged through the smelter stack; fugitive emissions account for an additional 10 tons/day of sulfur lost to the atmosphere. The overall smelter control efficiency is 90.1%.

57536

APTIC NO. 81895

Weisenberg, I. J. and J. C. Serne

DESIGN AND OPERATING PARAMETERS FOR EMISSION CONTROL STUDIES: PHELPS DODGE, MORENCI, COPPER SMELTER (FINAL REPORT). *Pacific Environmental Services, Inc., Santa Monica, Calif., Environmental Protection Agency Contract 68-02-1405, Program Element 1AB013, ROAP 21ADC-061, Task 5, Rept. EPA-600/2-76-036g, 23p., Feb. 1976. 5 refs.*

Design and operating data for a specific copper smelter are presented, with particular emphasis on lean sulfur dioxide streams that are currently not being controlled. The greatest source of uncontrolled SO₂ emissions at the smelter is the reverberatory furnaces. Presently, 92,845 tons/yr of sulfur passes from the reverberatory furnaces to the stack. The roaster and converters are controlled by acid plants, with the total sulfur captured being around 62% (maximum). Pollution control equipment consists of wet scrubbers and baghouses for the concentrate dryers, precipitate kiln, lime kiln, and lime reactor. Roaster gases are treated in cyclones, a wet scrubber, and finally a single contact acid plant for SO₂ removal. Converter gases, after cooling, are passed through an electrostatic precipitator, a humidifying tower, cooling tower, packed tower, an additional precipitator, a drying tower, and finally a new single contact acid plant with a rated maximum capacity of 2500 tons/day. (Author summary modified)

Weisenberg, I. J. and J. C. Serne

DESIGN AND OPERATING PARAMETERS FOR EMISSION CONTROL STUDIES: PHELPS DODGE, DOUGLAS, COPPER SMELTER (FINAL REPORT).

Pacific Environmental Services, Inc., Santa Monica, Calif., Environmental Protection Agency Contract 68-02-1405, Program Element 1AB013, ROAP 21ADC-061, Task 5, Rept. EPA-600/2-76-036h, 36p., Feb. 1976. 4 refs.

Design and operating data for a specific copper smelter are presented, with particular emphasis on lean sulfur dioxide streams that currently are not being controlled. The major uncontrolled sources of SO₂ and particulate matter are the roasters, reverberatory furnaces, and converters. Approximately 488,852 tons/yr of SO₂ and 13,634 tons/yr of particulate matter are emitted from the smelter. There appears to be sufficient space and utility availability for the installation of additional control equipment, although distance from the smelting operation and structural interferences may increase cost and operational problems. The existing pollution control equipment consists of four parallel electrostatic precipitators handling the gases from 24 roasters, a ballon flue and three parallel electrostatic precipitators for reverberatory furnace gases, and a ballon flue and four parallel electrostatic precipitators for converter gases. Roaster and reverberatory furnace gases are discharged to a 544-foot stack. Converter gases are discharged to a 564-foot stack. (Author summary modified)

Engineering-Science, Inc., McLean, Va.

AIR POLLUTION EMISSION TEST. W. R. GRACE CHEMICAL CO. Office of Air and Waste Management Contract 68-02-1406, Task 14, Rept. 75-PRP-1, 36p., Jan. 1976. 2 refs.

Particulate emissions tests were performed at the outlets of two electrostatic precipitators serving the phosphate rock drying operations at the W. R. Grace Chemical Company in Bartow, Florida to aid the Environmental Protection Agency in setting performance standards for new phosphate rock dryers. The average hourly particulate emission rate was 9.7 lb/hr (front-half catch only) corresponding to a concentration of 0.010 grains/dry standard cu ft. On the basis of total catch, the average particulate emission rate was 12.8 lb/hr at a concentration of 0.013 grains/dry standard cu ft. Observed opacities rarely exceeded 5%.

Engineering-Science, Inc., McLean, Va.

AIR POLLUTION EMISSION TEST. THE ROYSTER COMPANY. Office of Air and Waste Management Contract 68-02-1406, Task 14, Rept. 75-PRP-2, 52p., Jan. 1976. 2 refs.

Particulate emissions tests were performed at the inlets and outlet of a baghouse serving the Royster phosphate rock grinding facility in Mulberry, Florida to gather data in support of establishing New Source Performance Standards. Particulate inlet rates ranged from 187-210 lb/hr, and inlet loadings averaged 2.3 grains/dry standard cu ft from a bowl mill and 4.1 grains/dry standard cu ft from a roller mill. Outlet total particulate emission rates averaged 0.15 lb/hr, and the average collection efficiency was 99.93%. Particulate results obtained with an in-stack filter train were consistently higher than the corresponding values obtained with a Method 5 train. Differences in front half mass emission rates for three runs amounted to 24, 374, and 49%. No visible emissions were observed at the baghouse outlet stack except for one or two instantaneous puffs of very light opacity. Particle diameters at the baghouse outlet ranged from 0.38 micron to 10.35 micron.

Engineering-Science, Inc., McLean, Va.

AIR POLLUTION EMISSION TEST. MOBIL CHEMICAL. Office of Air and Waste Management Contract 68-02-1406, Task 15, Rept. 75-PRP-3, 45p., Jan. 1976. 2 refs.

Particulate emissions tests were performed at the inlet and outlet of a scrubber-mist eliminator serving the Mobil Chemical Company phosphate rock drying facility in Nichols, Florida to obtain data for the development of New Source Performance Standards. The total inlet particulate concentration averaged 2.040 grains/dry standard cu ft, and the total outlet catch averaged 0.051 grains/dry standard cu ft. The average inlet and outlet mass emission rates were 1223 and 32.5 lb/hr, respectively. Overall scrubber removal efficiency was 97.3% based on total emissions. Particle size distribution data for the scrubber inlet and outlet were also obtained.

Office of Air and Waste Management, Research Triangle Park, N. C., Emission Measurement Branch

AIR POLLUTION EMISSION TEST. COLORADO FUEL AND IRON. Rept. 75-SIN-5, 71p., Feb. 1976. 4 refs.

Emissions tests were performed at the outlet of an electrostatic precipitator serving the Colorado Fuel and Iron Steel Corporation sintering process in Pueblo, Colorado to obtain data for the development of New Source Performance Standards. The particulate emission rate averaged 174.2 kg/hr, and the process basis emission rate was 0.481 kg/million tons of feed. The average fluoride emission rate was 3.85 kg/hr. Very few of the 6-minute average opacity readings were greater than 20%. High readings at the precipitator outlet were noted, however, following periodic rapping of the collecting plates.

Scott Environmental Technology, Inc., Plumsteadville, Pa.

SOURCE TESTING OF THE SULFUR RECOVERY UNIT SANTA ROSA PLANT EXXON COMPANY JAY, FLORIDA. Proj. 75-SRY-9, Rept. 75-SRY-9, 142p., Jan. 1976.

Background data were collected to develop New Source Performance Standards for control of emissions produced by Claus sulfur recovery plants in oil and natural gas fields. The stack emissions of the incinerator for the Claus sulfur recovery unit were tested for concentrations of sulfur dioxide, oxides of nitrogen, carbon monoxide, total hydrocarbons, moisture, carbon dioxide, oxygen, and velocity; the inlet gases for hydrogen sulfide, SO₂, moisture, CO₂, O₂, and velocity; and both acid gas and stripper gas for H₂S. The incinerator fuel gas was analyzed for carbonyl sulfide, H₂S, carbon disulfide, SO₂, methyl mercaptan, and ethyl mercaptan. The carbon monoxide concentrations in the incinerator effluent were considerably higher than expected from an incineration unit. Hydrocarbon emissions from the incinerator showed large cyclic changes over short periods. Nitrogen oxide concentrations of approximately 10 ppm occurred in the incinerator outlet. The sulfur dioxide measurements of the incinerator effluent by Environmental Protection Agency Method 6 showed substantial variation from sample to sample as compared to the gas chromatographic analyses of the undiluted stack gas. Initial difficulty with low SO₂ data also occurred when gas chromatographic samples were transferred through a sample line connected to the dilution stream. The incinerator was operated at temperatures of 950 F, 1050 F, and 1250 F during the second phase, and results were compared with data obtained at 1150 F during the first phase. The total reduced sulfur concentrations were 219, 162, 77, and 18 ppm, respectively, as the incinerator temperature was increased in 100 deg increments from 950 F to 1250 F. Two sets of simultaneous SO₂ data agreed well, but two sets of H₂S data from the same periods differed by a factor of two. It is not possible to determine which set of H₂S inlet readings is most accurate, because some of the necessary parameters were not recorded. (Author abstract modified)

57543

APTIC NO. 81558

Battelle Inst. E. V., Frankfurt am Main (West Germany)

PROJECTION METHODOLOGY FOR LARGE-AREA RESIDENTIAL AND TRANSPORTATION EMISSIONS. NATO/CCMS Rept. A. P. 1/1976 1.3 G, 1976. Translated from German, 50p.

A method for projecting large-area residential and transportation emissions is described. Emissions of sulfur dioxide, nitrogen oxides, hydrocarbons, carbon monoxide, soot, and lead are considered for the time interval 1960-1980. A computer model is developed for surveying surface elements with dimensions of 55 by 70 km. Methods for determining time dependent input data which include consumption values and emission factors are outlined, and a description of the forecasting methodology is provided. Emission calculations are performed for household and small-scale consumption as well as for road traffic.

57544

APTIC NO. 84411

Dept. of Transportation, Washington, D. C., Federal Aviation Administration

CONCORDE SUPERSONIC TRANSPORT AIRCRAFT (FINAL ENVIRONMENTAL IMPACT STATEMENT. VOLUME I. ADDENDUM). 49p., Feb. 1976.

The effects of Concorde operations on air quality at Dulles (IAD) and JFK International Airports is discussed. No adverse impact on air quality would result at either airport because of increases in 1978 traffic. At IAD, the resultant change in air quality due to increased level of Concorde traffic in 1987 for the worst case assumed is negligible. At JFK when there are low winds and poor dispersion, there would be a noticeable increase in carbon monoxide levels (0.5 ppm) in the JFK terminal area due to Concorde operations. Adding 25 Concorde flights to the projected subsonic traffic in 1987 would increase the area exposed to hydrocarbon concentrations greater than the 3-hour quality standard 0.24 ppm by 30% during the worst hour of the day.

1975

57545

APTIC NO. 83033

Adt, R. R., Jr., K. A. Chester, J. Pappas, and M. R. Swain

METHANOL-GASOLINE GLENDS: PERFORMANCE AND EMISSIONS. Preprint, American Inst. of Chemical Engineering, New York, 30p., 1975. 9 refs. (Presented at the American Institute of Chemical Engineers Meeting, Boston, Mass., Sept. 1975.)

The effect of blending up to 30 vol% methanol with Indolene on the steady state performance and exhaust emissions of a multicylinder, two-stage carbureted internal combustion engine adjusted to lean operation was investigated. Tests were run at around 2000 rpm and two load conditions: one corresponding to around 16 in. of mercury manifold vacuum and the other to around 10 in. Hg manifold vacuum. At equal-to-gasoline fueled operation torque and engine speed, nitrogen oxide mass emissions were less for the blends (about 60% less for the 30% blend). Carbon monoxide mass emissions increased with increasing blend levels, possibly as a result of an observed reduction in exhaust gas temperature with the blends. (Author abstract modified)

57546

APTIC NO. 79821

Ahern, William, Ronald Doctor, William Harris, Albert Lipson, Deane Morris, and Richard Nehring

ENERGY ALTERNATIVES FOR CALIFORNIA: PATHS TO THE FUTURE. EXECUTIVE SUMMARY. Rand Corp., Santa Monica, Calif., California State Assembly Contract LCB-18331 and Rockefeller Foundation Grant RF-71015, Rept. R-1793/1-CSA/RF, 40p., Dec. 1975.

The major results of a project to identify and analyze energy policy issues facing California are presented. Future uses and

sources of energy were estimated under three sets of assumptions. The situations examined to illustrate the possibilities for balancing energy sources and uses are medium production and medium use, medium production and low use, and low production and high use. Oil, gas, and electricity supply; energy conservation; and institutional issues are discussed. Conclusions and recommendations are presented. The energy conservation suggestions are directed mainly toward motor vehicle gasoline use, fossil fuels for industrial heat, and energy for heating and cooling residential and commercial buildings. A major reorganization of state energy activities would be premature at present.

57547

APTIC NO. 79908

Ahern, William, Ronald Doctor, William Harris, Albert

Lipson, Deane Morris, Richard Nehring, James Dehaven, Morlie Graubard, David Jaquette, Allen Lee, William Mooz, Richard Salter, and Kathleen Wolf

ENERGY ALTERNATIVES FOR CALIFORNIA: PATHS TO THE FUTURE. Rand Corp., Santa Monica, Calif., California State Assembly Contract LCB-18331 and Rockefeller Foundation Grant RF-71015, Rept. R-1793-CSA/RF, 321p., Dec. 1975. 231 refs.

The results of a study aimed at identifying and analyzing energy policy issues facing California are presented. An overview of the California energy system is provided, focusing primarily on a description of past and future sources and uses of energy in California to the year 2000. Nine energy supply issues are addressed: oil movement from West to East, offshore oil and gas development, a northern California deepwater port, liquefied natural gas, gas transportation from the North Slope of Alaska, natural gas regulation, natural gas allocation policies, electricity generation, and the development of alternative energy sources. Conservation measures are examined in the transportation, residential, commercial, and industrial sectors. The implications of three different scenarios of California's energy future, each of which incorporates a different set of policy actions, are described and discussed. Various institutional alternatives for formulating and implementing state energy policy are examined. Conclusions and recommendations are presented. (Author abstract modified)

57548

APTIC NO. 84207

Akagi, Hideto and Akio Kobayashi

ANALYSIS OF PLASTICIZERS AND HYDROGEN CHLORIDE DURING PROCESSING OF POLYVINYL CHLORIDE COMPOUNDS. (Enka biniru kakodoki no haigasu chu no kazoai to no bunseki). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):374, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 121.)

The plasticizers and hydrogen chloride in flue gas generated from 5 vinyl chloride processing factories were analyzed by gas chromatography equipped with flame ionization detector. The plasticizers analyzed included dibutyl phthalate, dioctyl phthalate, diisodecyl phthalate, dioctyl adipate, and benzyl phthalate. The flue gas sampling method was as follows: the flue gas was bubbled through two absorption bottles, in series, each containing 80 ml n-hexane, which was then combined and the n-hexane solution was condensed to 1 ml. This n-hexane solution was injected into GC with a 3% OV-17 chromosorb W column at a temperature between 200 to 280 C. The detection limit of this GC for plasticizers was 0.1 mg/N cu m with 100 l flue gas collection. The results of the analysis for one factory showed 110.6 mg/N cu m of dibutyl phthalate, 61.5 mg/N cu m of benzyl phthalate, 378.4 mg/N cu m of dioctyl phthalate, and 9.7 mg/N cu m of dioctyl adipate; one other factory indicated only 6.0 mg/N cu m of diisodecyl phthalate. The hydrogen chloride level in flue gases ranged from 0.6 to 5.0 mg/N cu m.

57549

APTIC NO. 81614

Andersen, Ib, G. R. Lundqvist, and L. Molhave

INDOOR AIR POLLUTION DUE TO CHIPBOARD USED AS A CONSTRUCTION MATERIAL. *Atmos. Environ.*, 9(12):1121-1127, 1975. 17 refs.

Indoor air pollution resulting from the use of particle board (held together with a urea-formaldehyde glue) as a construction material was investigated. Air quality measurements in 25 rooms where particle board was used in walls, floors, and ceilings revealed formaldehyde concentrations ranging from 0.08-2.24 mg/cu m, with the average concentration being 0.62 mg/cu m. The maximum formaldehyde concentration exceeded the German threshold limit for occupational exposure (1.2 mg/cu m), and the German limit for continuous exposure in outdoor air (0.03 mg/cu m) was exceeded in all rooms. The equilibrium concentration of formaldehyde from particle board was found to be directly proportional to temperature and water vapor concentration in the air during climate chamber experiments. A hyperbolic decrease in formaldehyde concentration was observed at increasing ventilation rates. A mathematical model for the room air concentration of formaldehyde was established from the above data and was successfully used to predict measurements in dwellings and in climate chambers, with correlation coefficients of 0.88 and 0.94 being obtained, respectively. (Author abstract modified)

57550

APTIC NO. 80069

Arrandale, Roy S.

POLLUTION CONTROL IN FUEL FIRED TANKS. PART 10. *Glass Ind.*, 56(9):18, 20, 22, 24, Sept. 1975. 2 refs.

The major pollutants from glass furnaces are the noncondensable oxides of nitrogen, which are formed naturally at high temperatures in the combustion flame. Stack height is used to control them. Although air pollution control laws treat glass furnaces differently in different localities, the intent is to restrict the amount of condensibles plus particulate matter emitted in to the air. Restrictions on emission sources have progressively entered the realm of restrictions governing operation and maintenance.

57551

APTIC NO. 80006

Assuncao, Joao and Morton Corn

THE EFFECTS OF MILLING ON DIAMETERS AND LENGTHS OF FIBROUS GLASS AND CHRYSOTILE ASBESTOS FIBERS. *Am. Ind. Hyg. Assoc. J.*, 36(11):811-819, Nov. 1975. 16 refs.

The fibers per volume of air in the fibrous glass industry are very low when compared with the concentrations of fibers in the working environment of the asbestos industry. Fundamental differences in the breakage characteristics of these two types of fibers could explain these findings. A laboratory study was performed to determine the effects of milling on the physical dimensions of fibrous glass and chrysotile fibers. A wool type fibrous glass and chrysotile asbestos were ball milled, one at a time, for selected periods of time. Samples were analyzed by phase contrast microscopy and observed with an electron microscope. Milling had no significant effect on the diameters of fibrous glass fibers, but reduced the lengths of these fibers and reduced both diameters and lengths of chrysotile asbestos. The ratio of fibers to fibers and particles in fibrous glass decreased with the increase in milling time. This investigation suggests that the breakage characteristics of fibrous glass and chrysotile asbestos fibers are responsible for findings of lower concentrations of fibers in air in fibrous glass manufacturing facilities, when compared to concentrations of fibers in air in asbestos manufacturing facilities.

57552

APTIC NO. 76152

Baladi, Emile

AIR POLLUTION EMISSION TEST. BEKER INDUSTRIES, INC. *Midwest Research Inst., Kansas City, Mo.*,

AIR POLLUTION ABSTRACTS, JUNE 1976

Office of Air and Waste Management Contract 68-02-1403, Proj. 3927-C(13), Rept. 75-PRP-4, 83p., Nov. 19, 1975. 3 refs.

Particulate emissions tests were performed at the baghouse of a ball mill and the venturi scrubber of a calciner serving the Beker Industries, Incorporated phosphate rock processing operation at Conda, Idaho to obtain data for the development of New Source Performance Standards. The average particulate load value at the outlet of the baghouse was 0.00218 grains/dry standard cu ft, and the average particulate removal efficiency of the baghouse was 99.96%. The average particulate load value at the outlet of the scrubber was 0.04651 grains/dry standard cu ft. Fluoride emissions from the facility averaged 0.058 kg/hr. The average percent opacity was 0.0 at both the calciner's scrubber and the ball mill's baghouse outlet. Particle size distribution data were also obtained.

57553

APTIC NO. 80121

Banwart, W. L. and J. M. Bremner

IDENTIFICATION OF SULFUR GASES EVOLVED FROM ANIMAL MANURES. *J. Environ. Quality*, 4(3):363-366, July-Sept. 1975. 17 refs. (Presented at the Soil Science Society of America, Chicago, Ill., Nov. 13, 1974.)

Evolution of volatile sulfur compounds from animal manures was studied by gas chromatographic techniques. Trace (nanogram) amounts of sulfur gases were detected and identified in the presence of nonsulfur gases known to be released through microbial decomposition or organic materials. All manures released hydrogen sulfide, methyl mercaptan, and dimethyl sulfide when incubated under anaerobic conditions, and some release dimethyl disulfide, carbonyl sulfide, and/or carbon disulfide. Only trace amounts of dimethyl sulfide were detected in the gaseous products of decomposition of manures under aerobic conditions. There is no evidence that sulfur gases contribute to the odors of dried manures. Most of the sulfur volatilized when manures were incubated under anaerobic conditions was in the form of hydrogen sulfide and methyl mercaptan. The amount of sulfur volatilized in 1 mo to 23 C represents less than 1% of the total sulfur in the manures. (Author abstract modified)

57554

APTIC NO. 76436

Barker, Richard G.

HIGH YIELD ALKALINE PROCESSES. *Preprint, American Inst. of Chemical Engineers, New York, 34p., 1975. 33 refs. (Presented at the American Institute of Chemical Engineers Conference, Sept. 9, 1975.)*

High yield alkaline processes are discussed. Those which appear to be most feasible in the near future are the caustic/carbonate combinations and green liquor pulping. These pulping systems are easier to implement since existing equipment can be utilized. There is also considerable incentive for their implementation because of modified sulfur/soda balances in many existing mills as a result of more stringent air pollution emission requirements.

57555

APTIC NO. 80490

Bartle, Keith D., Terence G. Martin, and Derek F. Williams

CHEMICAL NATURE OF A SUPERCRITICAL-GAS EXTRACT OF COAL AT 350 C. *Fuel*, 54(14):226-235, Oct. 1975. 61 refs.

A novel supercritical gas (toluene) extract, comprising 17% of a low rank coal, was separated by a combination of solvent fractionation and both silica gel and gel permeation chromatography. The average structure of the soluble fractions, together amounting to 85% of the extract, was investigated by a variety of spectroscopic methods and gas chromatography. The results for the low oxygen fractions are consistent with a generally open chain polynuclear aromatic average structure with about 33% of the available sites carrying alkyl substituents. The most common of these is methyl, but there are also substantial num-

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bers of longer chain alkyls, some branched, and naphthenic groups. The fractions rich in oxygen have similar structure, except for the presence of phenolic hydroxyl groups, and, as is demonstrated for the first time by ¹³C carbon nuclear magnetic resonance, ether O2 links. Aliphatic constituents are mainly straight chain alkanes with some branched chain and isoprenoid hydrocarbons. (Author abstract modified)

57556

APTIC NO. 81978

Baruch, Stephen B.

UTILITY INDUSTRY SULFATE RESEARCH PROGRAMS. Air Pollution Control Assoc., Pittsburgh, Pa., East Central Section 23p., 1975. 9 refs. (Presented at the Air Pollution Control Association Meeting, East Central Section, 32nd, Dayton, Ohio, Sept. 18, 1975.)

Results of a survey on the electric utility industry sulfate research programs are presented. Several sulfate monitoring programs are discussed. Sulfate conversion in power plant plumes is being studied. A project studying long range transport of emissions from coal fired power plants is in progress. The Electric Power Research Institute's sulfate research program involves sulfate monitoring, sulfate identification, sulfate conversion in a power plant plume, and sulfate health effects. Another sulfate health effects project includes a description of the transport and formation of sulfates in the atmosphere and the current state of knowledge relative to the control and effects of sulfates. It delineates the scope of the uncertainty regarding the health effects of sulfates. A research plan is being formulated on acid aerosols and suspended particulates in the atmosphere. A survey of utility sulfate monitoring has been completed. The data is being evaluated in regard to implementing a utility sulfate monitoring network. Ambient sulfate monitoring is the major emphasis of utility sulfate research. Individual utility ambient sulfate concentrations ranged from 2 microgram/cu m. Particle size monitoring technology is just becoming available. The objective of utility sulfate research is to broaden the secondary air pollutant data base and the conceptual framework for understanding it.

57557

APTIC NO. 83715

Baum, Fritz

CONTROL MEASUREMENTS OF FIRING SYSTEMS IN HOUSEHOLDS AND SMALL COMMERCIAL ENTERPRISES (2). (Kontrollmessungen an Feuerungsanlagen in Haushalt und Kleingewerbe). Text in German. Sanit. Heizungstechn., 40(9):526-531, Sept. 1975.

With respect to the German federal law of September 1974 on emission allowances, investigations in thermal engineering have been made relative to furnaces using solid fuels. A measuring technique is described employing a heatable sampling probe with gripping devices for a filter, flexible connection and a suction pump in determining the soot tar content of solid-fuel furnaces with a nominal heat capacity of 80,000 kJ/hr. Measuring equipment also was considered for CO₂, smoke temperature, pressure differences and SO₂ emissions, which are the subject of further legislation. Burner-boiler combines as they affect soot accumulation and efficiency are discussed as well as underfired ovens.

57558

APTIC NO. 79778

Beavington, F.

POLLUTION BY HEAVY METALS OF RIVULET AND HARBOUR WATER IN WOLLONGONG. Search, 6(9):390-391, Sept. 1975. 3 refs.

The sources and transport of heavy metal pollutants in Wollongong, Australia are discussed. Analyses of the easily extractable fraction of copper, zinc, lead, and cadmium in the soil, and of the total content of Cu, Zn, and iron in grasses and clover in the Wollongong city area show relatively high levels of contamination by these metals. The levels are highest in the vicinity of the heavy metals industries. The airborne origin of these metals is strongly suggested by statistically sig-

nificant correlations between their levels in soil and herbage and distance from the smelting complex and by the concentration of easily extractable Zn, Cu, Pb, and Cd in the top 15 cm of the undisturbed soil column. A further source of industrial contamination is the effluent that is discharged from the heavy metals industries by outfalls that empty directly into the harbor and rivulets. Five industrial outfalls were sampled and indicate contamination from the main metal processes involved. The levels of Zn in Wollongong harbor water range from 0.1 ppm in the middle of the harbor to 1.34 ppm near the outfalls. The concentration of Zn in the mid-harbor water is higher by tenfold, Cu by 40 fold, manganese by 70 fold, whilst Fe, Cd, and Pb are 120, 350, and 10,000 times greater respectively.

57559

APTIC NO. 76411

Bekturov, A. B., G. N. Breusova, and V. K. Esik

PHYSICO-CHEMICAL INVESTIGATION OF DUST GENERATED IN DEFLUORINATED PHOSPHATE PRODUCTION FROM KARATAU PHOSPHORITES. (Fiziko-khimicheskie issledovaniya pyley, obrazuyushchikhsya pri proizvodstve obesflorennogo fosfata iz fosforitov (Karatu). Text in Russian. Izv. Akad. Nauk Kaz. SSR, Ser. Khim., no. 3:1-5, May-June 1975. 6 refs.

The behavior of dusts separated in electrostatic precipitators in the defluorinated phosphate production from Karatau phosphorites during heating in the 100-1300 C temperature range was studied under laboratory conditions. Heating in the 100-700 C temperature interval caused weight losses ranging from 1 to 13%, depending on the chemical composition of the dust. About 30 to 70% of the fluorine was liberated at temperatures of up to 600 C due to the decomposition of the fluorosilicates. A further increase of the temperature to 1300 C led to an increase in the defluorination rate to 70-95% only in the presence of water vapor. At temperatures over 900 C, potassium compounds volatilized at a rate of 40-60%, while other alkali metal compounds were not affected.

57560

APTIC NO. 76075

Bellamy, R. G. and W. A. Schwartz

ENGINEERING AND COST STUDY OF AIR POLLUTION CONTROL FOR THE PETROCHEMICAL INDUSTRY. VOLUME 9: POLYVINYL CHLORIDE MANUFACTURE (FINAL REPORT). Air Products and Chemicals, Inc., Marcus Hook, Pa., Houdry Div., Office of Air and Waste Management Contract 68-02-0255, Rept. EPA-450/3-73-006-i, 110p., July 1975. 7 refs.

NTIS: PB 247705/AS

An engineering and cost study of air pollution control for the polyvinyl chloride manufacturing industry is presented. The total vinyl chloride monomer emissions from various processes involved in polyvinyl chloride manufacturing are estimated to amount to 57,812.7 tons/yr. The total capital investment increase for emission control devices at a 200 million lb/yr plant incorporating moderate emission control devices is estimated at \$1,005,000, while that for a similar plant incorporating extensive emission control is estimated at \$2,310,000. An engineering description of available control devices is provided along with data on material balances and emissions generated.

57561

APTIC NO. 75958

Beltzer, Morton

PARTICULATE EMISSIONS FROM PROTOTYPE CATALYST CARS. Exxon Research and Engineering Co., Linden, N. J., Products Research Div., Environmental Protection Agency Contract 68-02-1279, Program Element 1AA002, ROAP 21BCE-02, Rept. EPA-650/2-75-054, 224p., May 1975. 60 refs.

NTIS: PB 244889/AS

Particulate emissions from a vehicle equipped with a variety of commercial and prototype catalyst systems were measured and characterized. The catalysts used comprised four monolithic

and three pelleted oxidation catalysts and two nitrogen oxide reduction catalysts. The 1975 Federal Test Procedure was used. Particulate emissions increased due to the formation of sulfuric acid from exhaust sulfur dioxide. Sulfates and associated bound water were the predominant components of the exhaust particulates, followed by minor quantities of organic particulates and metal-derived particulate (mostly iron). The relative contributions of the latter two types of particulate decreased with increasing fuel sulfur content. Substantial differences in the sulfuric acid formation tendency of different oxidation catalysts were observed. (Author summary modified)

57562

APTIC NO. 84226

Benad, Peter, Guenter Blamberg, and Frank Wolf

PROBLEMS OF ENVIRONMENTAL PROTECTION IN SOFT COAL POWER PLANTS. (*Probleme des Umweltschutzes bei Braunkohlekraftwerken*). Text in German. *Energietechnik*, 25(10):467-471, 1975. 19 refs.

The effects of soft-coal consuming electric power stations on the ecology, the technical status of measures aimed at diminishing these effects, the economical consequences for the generation of electric power and long-term planning of the necessary steps to be taken are discussed. The construction and operation of new power stations remove useful land (agriculture, forestry), affects the landscape architecturally and increased noise. Smoke and gas emission adversely affected the ecology of the area. Countermeasures include: higher smokestacks, improved flue gas purification, application of technological processes reducing waste gas, and dust separation. Fly ash deposition causes widespread environmental pollution. Countermeasures applied involved technical control of the pollutant and its possible future utilization as a secondary raw material. Since as much as 75% of the energy used was wasted as heat, its elimination was not possible, but it could be partly utilized for hothouses and heating of fish-breeding ponds. Sewage emission resulting from the operation of the station was brought under control by neutralization, purification, sedimentation, and biological cleansing processes. Investment for the technological control of pollution ran to a total of \$27,000,000, the most expensive item being waste gas purification at \$22,000,000. Annual operational cost was \$2,000,000 of which waste gas purification was \$1,000,000. In the future, ecological measures would have to be incorporated into all levels of planning, additional or reduced cost would have to be adjusted to ecological coefficients in new investments and reconstructions, controls and imposition of fines would have to be stricter upon exceeding preset limits, and more enlightenment of the people in the field of environmental protection would be required.

57563

APTIC NO. 76593

Benbow, A. W. and C. F. Cullis

THE FORMATION OF TOXIC PRODUCTS DURING THE COMBUSTION OF HALOGEN-CONTAINING POLYMERS. *Eur. Polym. J.*, 11(10):723-727, Oct. 1975. 15 refs.

Studies have been made of the decomposition of decabromobiphenyl and decabromobiphenyl ether both during the burning of polymers and under the less oxygen rich conditions involved in the incineration of plastic waste material. The nature of the products depends on the type of combustion. The two flame retardants volatilize unchanged during flameless combustion. However, when polymer containing the additive burns with a flame, hydrogen bromide is the only significant product containing bromine. Product distributions in flames above burning polymers show that the concentration of the halide increases from zero at the molten polymer surface to a value corresponding to total conversion of the halogen at and beyond the flame front. (Author abstract)

57564

APTIC NO. 84232

Benvenuti, Francesco and Corrado Ciccarelli

THE LEAD CONCENTRATION AT THE WORKING PLACE OF MANUFACTURING AND PROCESSING PLANTS OF LEADED STEEL. (*Die Bleikonzentration am Arbeitsplatz bei der Herstellung und Verarbeitung von Bleistahl*). Text in German. *Staub, Reinhaltung Luft*, 35(12):427-430, 1975. 8 refs.

The lead concentrations occurring during the production of leaded steel and during its subsequent processing (flaming, cleaning, grinding, and rolling) were measured. Lead was present in the air at all locations; the concentrations varied, however, from process to process. The highest concentrations were found during the addition of lead and during the filling of casting ladles and ingot molds. High values were also found at the locations of flammers, cleaners, and grinders. The lead content of the rolling mill air was always low. Biological investigations were consistent with the air quality values measured.

57565

APTIC NO. 83978

Bermejillo, Manuel

COLLOQUIUM ON ENVIRONMENTAL POLLUTION. 1ST SCIENTIFIC SESSION. (*Coloquio sobre contaminación ambiental. 1 Sesión Científica*). Text in Spanish. *An. Real Acad. Nacional Med.*, 92(2):109-111, 1975.

The importance of contributing factors which enhance the perils of air pollution are stressed. Smoke, gases, dust, and fog affect humans directly, and act on vegetable and animal life with consequent alterations of human food sources. The psychic and psychophysical disturbances characteristic of the continuous stress present in modern society must be strongly considered. The problems of noise pollution, and occupational pollution hazards to which miners and workers in the metal and plastics industry are subject are also mentioned.

57566

APTIC NO. 84140

Bermejillo, Manuel

COLLOQUIUM ON ENVIRONMENTAL POLLUTION. (*Coloquio sobre las ponencias desarrolladas con el tema Contaminación ambiental*). Text in Spanish. *An. Real Acad. Nacional Med.*, 92(2):297-317, 1975.

The direct relationship between climate (polluted fog; cold weather), poor economic conditions, industrial pollution, and tobacco smoking, and the incidence of deaths from chronic bronchitis and bronchial cancer in various regions of Spain and other European countries are reviewed. In Spain, on the Atlantic-Mediterranean littoral, the highest mortality from chronic bronchitis (40/100,000 population) was reported in Orense and Lugo provinces, which have a higher number of foggy days and temperatures of -6 C, but low air pollution levels. Provinces with high economic levels, such as Vizcaya and Guipuzcoa, had a mortality of 24/100,000, while the North-Coastal Regions with low per capita income had a mortality of 30/100,000. In Madrid and Barcelona, 2nd and 3rd in per capita income, the mortality index was 17 and 13/100,000, respectively. However, in the cold continental zone surrounding Madrid the average was 26; in the Mediterranean zone near Barcelona the mortality was 18/100,000 while in Barcelona province it was 13/100,000. The influence of air pollution on the infantile population and an increase in cases of infantile asthma, especially in urban areas is noted. Respiratory mechanisms of defense are not completely developed in children, while the presence of infective agents diminishes the resistance to irritations caused by air pollution agents. Air and water pollution caused by industrial waste (sulfur trioxide and hydrogen sulfide) discharged by a factory in Bilbao (Spain) are mentioned. Installation of anti-pollution devices has been considered too costly by the management. Aquatic and marine pollution and the possibility of the disappearance of all aquatic life is discussed. The damaging effects of certain pesticides (organophosphoric compounds and carbamates) on the vegetal-animal-human chain are discussed.

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APTIC NO. 76185

Bernard, Jeffrey, Paul Donovan, and H. T. McAdams

AUTOMOBILE EXHAUST EMISSION SURVEILLANCE ANALYSIS OF THE FY73 PROGRAM. Calspan Corp., Buffalo, N. Y., Office of Air and Waste Management Contract 68-03-0486, Rept. EPA-460/3-73-007, 64p., July 1975. 5 refs.

NTIS: PB 248600/AS

Exhaust emission tests were performed on 1080 in-use 1967 through 1974 model year automobiles and light trucks in six cities: Los Angeles, Denver, Detroit, St. Louis, Houston, and Newark. The mean hydrocarbon, carbon monoxide, and nitrogen oxide levels, averaged for all cities except Denver and Los Angeles, were: 5.78, 72.56, and 4.41 g/mi, respectively. The corresponding figures for Denver were 6.87, 108.54, and 2.84 g/mi, respectively; and those for Los Angeles were 5.44, 65.21, and 3.27 g/mi, respectively. Light duty vehicles showed a general downward trend in hydrocarbons, carbon monoxide, and nitrogen oxide emissions from 1966-1967 model years (pre-control in all cities except Los Angeles) to model year 1973. The influence of the new nitrogen oxides standard was especially noticeable. (Author summary modified)

57568

APTIC NO. 80293

Bilger, R. W. and B. W. Flood

OXIDES OF NITROGEN EMISSIONS FROM BAGASSE FIRED BOILERS. The Clean Air Society of Australia and New Zealand, Clean Air Conf. 1975 Proc., Rotorua, New Zealand, 1975, p. 199-211. 7 refs. (Feb. 17-21.)

Measurements of nitrogen oxide emissions from two bagasse-fired boilers in North Queensland, Australia were made in August 1973. The NO_x emission index for bagasse fuel ranged from 0.05-0.08 kg NO_x/million kJ. This figure is similar to natural gas with a typical index of 0.07 but is significantly lower than the NO_x index for fuel oil (0.14-0.3) and coal (0.10-0.40). The low NO_x emission index associated with bagasse fuel is related to the relatively low flame temperature and high level of excess air used. Further investigation is required to establish the mechanism by which NO_x is formed in a bagasse-fired boiler.

57569

APTIC NO. 80225

Bingaman, Dorothy J. and Lawrence E. Wangen

AIR QUALITY ASSESSMENT MODEL FOR AIR FORCE OPERATIONS -- SOURCE EMISSIONS INVENTORY COMPUTER CODE DOCUMENTATION. Argonne National Lab., Argonne, Ill., Energy and Environmental Systems Div., Air Force Contract, 140p., 1975. 2 refs.

A computer code for the Source Inventory Model is documented. The Source Inventory Model is the source emissions part of the Air Quality Assessment Model for Air Force operations at the airbase level. Flow charts, listings, and brief descriptions of each routine are included. (Author abstract modified)

57570

APTIC NO. 83128

Biro, Zsigmond

ENVIRONMENTAL POLLUTION AS REFLECTED BY MERCURY, LEAD, AND CADMIUM EXPOSURE. (A környezetszennyezodes a higany, olom es kadmium expozicio tukreben). Text in Hungarian. Egesszsegudomány, 19(3):217-232, 1975. 117 refs.

Studies on the sources and occurrence of mercury, lead, and cadmium in air, water, soil, plants, animals, and food are reviewed. The mercury concentrations measured in the air in Heidelberg, Paris, Chicago and Niles, Mich., ranged from 0.17 to 11.2 g/cu m. A concentration of 50 micrograms/cu cm was measured near a mercury distilling plant in Yugoslavia. Mercury concentrations of up to 5 micrograms/cu m were measured in a room painted with paint containing organomercurial fungicide. The total mercury content of rainwater and snow in dif-

ferent countries ranges from 0.005 micrograms/liter to 500 micrograms/liter. Mercury is released into the air during the combustion of mercury-containing fuels, such as coal and oil. Lead concentrations of 0.1-1000 ppm were measured around a lead smelter, 1-100 ppm around a coal-firing power plant, 400 mg/cu m around a nuclear power plant, 10-10,000 ppm around a steel mill, 100-10,000 ppm around a copper smelting plant, 100-1000 ppm around a cement works, 2500 ppm near a major highway, and 0.64-4.53 micrograms/cu m in Japanese towns. The lead concentration measurements carried out in Budapest revealed a concentration of up to 5 micrograms/cu m in air, and 1-10 mg/g in settling dust. A relationship was established between the lead level in blood and hairs and the lead concentrations in air in children and policemen. Cadmium concentrations of 10-10,000 ppm were found near lead smelting and waste incinerator plants. Urban air contains usually up to 0.08 micrograms of cadmium per cu m.

57571

APTIC NO. 83064

Block, C. and R. Dams

LEAD CONTENTS OF COAL, COAL ASH AND FLY ASH. Water Air Soil Pollut., 5(2):207-211, Dec. 1973. 19 refs.

Flameless atomic absorption spectrometry was applied to the determination of lead in coal, coal ash, and fly ash. Lead concentrations in coal and coal ash ranged from 7 to 110 microgram/g and 120 to 450 microgram/g respectively. A mean concentration of 1520 microgram/g in fly ash corresponding to a concentration of 117 microgram/cu m in the effluent gas suggests the importance of coal combustion as an atmospheric source of Pb. The contribution of coal combustion to the total Pb emissions is conservatively estimated at 6%. (Author abstract)

57572

APTIC NO. 76637

Boersma, M. A. M.

CATALYTIC AFTERTREATMENT OF EXHAUST GASES. PART 2. (Katalytische nabehandeling van uitlaatgassen 2). Text in Dutch. Polytech Tijdschr., Ed. Procestechiek (The Hague), 30(12):398-402, June 1975.

The causes and mechanisms of air pollutant formation in spark-ignition and diesel engines are described. The elimination of lead from the combustion chamber is facilitated by scavengers which convert the lead oxide into volatile halogenides. Both the carbon monoxide and hydrocarbon emissions are high in case of lean and fat mixture, i.e., they are lowest at cruising speed, while the nitrogen oxides emission is lowest at idle and deceleration. Carbon monoxide formation is due to the incomplete combustion of the air-fuel mixture, and hydrocarbons are formed as a result of incomplete combustion due to wall quench and crevice quench. The nitrogen oxides emission is highest at stoichiometric air-fuel ratio. The dissociation of the nitric oxide formed to nitrogen and oxygen is prevented by rapid cooling. Diesel engine exhaust is characterized by reduced CO and hydrocarbon emissions and increased nitrogen oxides emissions as compared with spark-ignition engine exhaust. The formation of soot and malodorous components in diesel engines is abated by the addition of barium compounds some 75% of which are emitted in the form of barium sulfate. There are no data indicating the environmental hazards of such barium sulfate emissions.

57573

APTIC NO. 81861

Boldt, Karl R.

AIR POLLUTION EMISSION TEST. BETHLEHEM STEEL CORP (FINAL REPORT). York Research Corp., Stamford, Conn., Office of Air and Waste Management Contract 68-02-1401, Task 18, Rept. 75-SIN-1, Y-8479-18, 116p., Dec. 22, 1975. 2 refs.

Emissions tests were performed at the inlet and outlet of an electrostatic precipitator and the outlet of a baghouse located at Bethlehem Steel Corporation's sintering plant in Bethlehem,

Pennsylvania. The tests were performed as part of an Environmental Protection Agency effort to develop performance standards for new sintering operations. Average particulate loadings at the precipitator inlet and outlet were 0.2865 grains/standard cu ft and 0.0301 grains/standard cu ft, respectively. Particulate emissions at the baghouse outlet averaged 0.0133 grains/standard cu ft. Average opacities at the precipitator and baghouse stacks were 4% and 1%, respectively. Emission rates at the precipitator outlet for condensable hydrocarbons, non-condensable hydrocarbons, fluoride, carbon monoxide, sulfur dioxide, sulfur trioxide, and nitrogen oxides were 0.778, 609, 2.46, 6837, 1791.3, 28.5, and 102.2 lb/hr, respectively. (Author summary modified)

57574

APTIC NO. 83217

Boranec, Vilim

A CONTRIBUTION TO THE PROBLEM OF THE DETERMINATION OF AIR POLLUTION BY SULPHUR DIOXIDE, COMING OF BURNING DOWN THE TECHNICAL FUELS. (Prilog problematici određivanja zagađivanja zraka sumpornim dioksidom nastalom spaljivanjem tehničkih goriva). Text in Serbo-Croatian. *Nafta (Zagreb)*, no. 10:547-551, 1975. 7 refs.

Air pollution in certain areas of Yugoslavia was evaluated. The most economically developed communities were chosen, taking into consideration the population in these areas and the income of the whole national economy. The air pollution was calculated in relation to the size of the communities, the liquid fuel consumption in the whole country, and the amount of sulfur in the fuels. The estimated pollution can be used for determining the actual pollution in these communities.

57575

APTIC NO. 82216

Borneff, J.

DRINKING WATER STEMMING FROM SURFACE WATER EXEMPLIFIED BY LAKE ZURICH WITH REGARD TO POLYCYCLES, METALS, AND CHLORINATED HYDROCARBONS. (Trinkwassergewinnung aus Oberflächenwasser am Beispiel des Zuerichsees unter Berücksichtigung von Polyzyklen, Metallen und Chlorkohlenwasserstoffen). Text in German. *Gas, Wasser, Abwasser*, 55(9):467-472, 1975. 19 refs.

Problems of surface water contamination with polycyclic aromatic hydrocarbons, metals, and organochlorine pesticides, and its implication for the use of surface waters for drinking water preparation are discussed. Surface waters are contaminated with 3,4-benzo(a)pyrene and other carcinogenic substances due to direct sedimentation from the air or due to storm runoff from areas where they had settled. Air pollution is chiefly responsible for water pollution with 3,4-benzo(a)pyrene.

57576

APTIC NO. 83395

Bourelly, T.

AIR POLLUTION DUE TO BLACK SMOKE AND HIGH ACIDITY AROUND THE BP PETROLEUM REFINERY AT VERNON. (La pollution atmosphérique en fumée noire et acidité forte autour de la raffinerie de pétrole BP de Vernon). Text in French. *Pollut. Atmos. (Paris)*, 17(66):125-139, April-June 1975.

The average pollution for the Vernon area for 1973-1974 was low: 16.5 microgram/cu m for black smoke, 25.5 microgram/cu m for high acidity. The maximum monthly averages were reached in March: 33 microgram/cu m for black smoke, 37 microgram/cu m for high acidity. The evolution of black smoke pollution over 6 years (1968-1974) was basically the same for all 4 posts at which measurements were taken and inversely proportional to temperature. For high acidity, 6-year evolution was the same for 3 of the posts while, at the fourth, the pollution increase was more significant during the last 3 years due to increased hospital emissions. The sequential mea-

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suring apparatus SERES only registered 41.5% of acidity results during the warm season and 76.5% during the cold season. A comparison between the SF/15 and the SERES shows that in 81% of cases the results obtained with the SF/15 were superior to those obtained with the SERES. The average difference was 6.4 microgram/cu m.

57577

APTIC NO. 80281

Bowling, G. John, Arnold H. Gruber, and W. C. Rutledge

RESULTS OF TESTING OF THE IKOR IN-STACK CONTINUOUS PARTICULATE MONITOR AT A PAPER MANUFACTURING FACILITY (BLACK LIQUOR RECOVERY FURNACE STACK). Preprint, *Air Pollution Control Assoc., Pittsburgh, Pa.*, 20p., 1975. (Presented at the Air Pollution Control Association, East Central Section Meeting, 32nd, Dayton, Ohio, Sept. 17-19, 1975.)

Results from tests with an in-stack continuous particulate monitor installed in a horizontal duct section of a recovery boiler at a paper manufacturing facility are presented. The real-time continuous monitor operated on the principle of charge transfer. The electronic sensing system consisted of an electrically conductive sensing element mounted in the gas stream and connected to a high gain amplifier. Steady-state electronic signal conditions were established with the in-stack sensor within 15-20 min, and a stable reproducible continuous readout of emissions from the kraft recovery furnace was achieved over a 5.5-hour test period. A correlation between the monitor's electronic signal and the Method 5 filter and probe weight gain was obtained, with a one sigma standard deviation of + or - 7.6%.

57578

APTIC NO. 75960

Bowman, Craig T. and Leonard S. Cohen

INFLUENCE OF AERODYNAMIC PHENOMENA ON POLLUTANT FORMATION IN COMBUSTION. VOLUME I. EXPERIMENTAL RESULTS (FINAL REPORT). United Technologies Research Center, East Hartford, Conn., Environmental Protection Agency Contract 68-02-1092, Program Element 1AB014, ROAP 21BCC-014. Rept. EPA-650/2-75-061-a, 159p., July 1975. 27 refs.

NTIS: PB 245344/AS

Factors affecting the concentrations of nitric oxide, nitrogen dioxide, carbon monoxide, and unburned hydrocarbons at the exhaust of an axisymmetric combustor over a significant range of operating conditions are examined. Major combustor input parameters are varied over the following ranges: overall fuel/air equivalence ratio 0.5-1.3, air-fuel velocity ratio 0.1-40, inlet air swirl number 0-0.6, air flow rate 0.09-0.14 kg/sec, inlet air temperature 730-860 K, and combustor pressure 1-7 atm. The primary hydrocarbon combustion zone, where most of the hydrocarbon fuel reacts to form carbon monoxide, is located relatively close to the injector (within an axial length of about 5 combustor radii). High levels of both CO and NO are established in this zone. Peak CO levels in the primary zone are significantly larger than equilibrium levels. Near the injection plane, NO₂ concentrations in excess of the NO concentrations are measured in the shear region separating the inner and outer flows. The NO₂/NO ratio decreases in the post-combustion zone.

57579

APTIC NO. 83711

Breuer, Hans

RESEARCH AND DEVELOPMENTS IN THE COMBAT AGAINST DUST AND SILICOSIS. (Forschung und Entwicklungen in der Staub- und Silikosebekämpfung). Text in German. *Glueckauf (Essen)*, 111(16):767-773, 1975. 18 refs.

Maximum allowable concentrations of 4.0 mg/cu m for quartz-bearing dust and of 0.15 mg/cu m for quartz dust have been considered on the basis of epidemiological research in bituminous coal mines as the mean values for dust exposure over a 5 year period. In 1974 routine gravimetry was introduced to

evaluate a West German mine. The Tyndallometer TM digital indicated rapid changes in dust concentration, and the measuring signal could be recorded and integrated in auxiliary instrumentation. Dust concentration has been reduced in coal mining by the infusion of adit ends, hydraulic plough tracks, and the decrease of dust build-up on impact roll crushers. Improvements have also been made in tunneling by use of better dedusting installations on headers for part-face and full-face blasts. Further research has yet to be undertaken on the dedusting of rolling cutter loaders, hydraulic ploughs, and dust control in a stepwise longwall.

57580

APTIC NO. 79787

Bridge, A. G., J. W. Scott, and E. M. Reed

WAYS TO HYDROPROCESS RESIDS. *Hydrocarbon Process.*, 54(5): 75-81, May 1975. 13 refs. (Presented at the API Division of Refining Meeting, Chicago, Ill., May 15, 1975.)

A low sulfur fuel oil (LSFO) complex is being built that will use vacuum gas oil (VGO) and vacuum residuum (VRDS) hydrotreating. A new VRDS catalyst has been developed which will improve the refinery's flexibility. A commercial run with a VGO hydrotreater desulfurizing vacuum gas oil derived from Middle Eastern crude is summarized. The VGO/VRDS and RDS hydrotreating are compared for the production of 0.5% sulfur fuel. The product yields from the two processes are approximately the same. The investment requirements for the two processes are also very nearly the same. There is a small advantage in operating costs for VGO/VRDS. Residuum hydroprocessing as a first step in residuum conversion provides flexibility in maximizing the production of transportation fuels. Products from a VRDS Hydrotreater can be further upgraded in a delayed coker, an Isocracker, or a fluid catalytic cracking unit. (Author abstract modified)

57581

APTIC NO. 84132

Brutsch, R.

THE POLLUTION OF THE ENVIRONMENT BY TRAFFIC. (*Die Belastung der Umwelt durch den Verkehr*). Text in German. Schweiz. Bauztg., 93(31):489-493, July 1975.

A study was undertaken to obtain a quantitative and comparative survey of environmental pollution caused by different types of vehicular traffic. Its objective was to secure a partial basis for the development of a total traffic concept in which pollution due to traffic would be restricted to a tolerable level. Today about 1/3 of the total environmental pollution in Switzerland is caused by traffic. About 20% of the energy consumption is traced to traffic (mostly fossil fuels). Traffic is also the 3rd-highest energy consumer after heating and industry. Quantitatively, the share of traffic in air pollution (carbon monoxide, hydrocarbons, nitrogen oxides, sulfur dioxide, soot, dust, and lead) is about 65%. Traffic produced 80% objectionable noise. In 1970, 46% of all individuals killed in accidents were victims of traffic. Furthermore, traffic, measured by its proportion in the national economy, polluted the environment more than average. The highest energy-consuming means of transportation was passenger cars, pick-up trucks, and the airplane (in long-distance traffic). Hydrocarbons and lead topped the list of traffic pollutants. Reduced environmental pollution is expected to be achieved by decreasing traffic volume, re-distribution of traffic volume, and exhaust control devices.

57582

APTIC NO. 76190

Bryan, Robert J.

AIR POLLUTION EMISSION TEST. KAISER STEEL CORPORATION. *Pacific Environmental Services, Inc., Santa Monica, Calif., Office of Air and Waste Management Contract 68-02-1405, Task 6, Rept. 75-SIN-3, 33p., Nov. 19, 1975. 2 refs.*

Particulate and fluoride emissions tests were performed on the outlet of a baghouse serving the iron ore sintering operation of the Kaiser Steel Corporation located in Fontana, California to obtain data for the development of New Source Performance Standards. The sintering plant agglomerates ore fines and flue dust to a product acceptable for charging into a blast furnace. The average particulate grain loading was 0.0378 grains/standard cu ft, and the average fluoride grain loading was 0.00015 grains/standard cu ft.

57583

APTIC NO. 79690

Businger, J. A.

INTERACTIONS OF SEA AND ATMOSPHERE. *Rev. Geophys. Space Physics*, 13(3):720-726, July 1975.

Air-sea interaction and research concerning it are discussed. The molecular sublayers near the surface form the bottleneck in the transfer of properties between sea and air, because rapid turbulent transfer is suppressed there. Surface temperature can be measured remotely with infrared or microwave radiometers. Drift, capillary waves, and small gravity waves are discussed. A theory has been developed which adequately describes the rapid growth of the long wave energy with increasing fetch. A number of remote sensing techniques have been applied to gain information about the shape of the water surface, and the effects of precipitation on and near the interface have been studied. The turbulent structure of the surface layer has been investigated mainly with the aim of obtaining the Kolmogorov constants for velocity, temperature, and humidity fluctuations. Studies of fluxes and profiles are also discussed. Several methods have been used to determine a suitable surface drag coefficient in bulk parameterization. A variety of models have been proposed for the structure of the boundary layers. Larger scale interactions are discussed. Theoretical models describe the major features of coastal upwelling. Serious efforts have been made toward a global numerical model of atmospheric-ocean interaction. A model of the effect of the atmosphere-ocean coupling on the climate has been developed.

57584

APTIC NO. 82313

Campbell, H. J.

SMOKE DENSITY AND TOXIC GAS EMISSION FROM THE COMBUSTION OF SOME BINARY FABRIC BLENDS IN NBS SMOKE DENSITY CHAMBER. *Can. Tex. J.*, vol. 1975:49-53, Feb. 1975. 11 refs.

The effect of fiber composition on toxic gas evolution from burning fabric was studied. A series of fabrics of similar weight and construction consisting of binary mixtures of 0, 25, 50, 75, and 100% of viscose rayon with modacrylic, acrylic, nylon, and wool were subjected to flaming and smoldering combustion in a smoke density chamber. Smoke densities were measured and Draeger gas analyses were carried out for carbon monoxide, hydrogen cyanide, and hydrogen chloride. The gas emission data were converted into toxicity indices which enabled a comparative evaluation of hazard to be made. The modacrylic and acrylic-containing fabrics, due to their relatively high HCN emission levels, clearly posed the greatest danger among the various materials studied in this work. The possibility that a potentially dangerous scaffolding effect exists in which the cellulosic component in a binary blend interacts with or supports a thermoplastic component so as to promote the evolution of greater than expected amounts of smoke or toxic gases seems to be born out by some of the data. (Author abstract modified)

57585

APTIC NO. 82695

Carrales, M., Jr. and R. W. Murtin

SULFUR CONTENT OF CRUDE OILS. *Bureau of Mines Information Cir.*, no. 8676:1-61, 1975. 11 refs.

Information on the sulfur content of crude oil in the United States and in some foreign countries is presented. Data are presented for oil produced in 1971 from fields in 26 states that

accounted for about 76% of the total United States oil production. The foreign data cover fields in 24 foreign countries that accounted for about 64% of the total oil produced from these countries in 1971. Low-sulfur oil producing during 1971 in the United States was about 1.71 billion barrels, slightly more than twice that of high-sulfur oil. Between 1969 and 1971, production increased by about 1.5%. The relative increase in low-sulfur oil reflects the increasing demand for clean fuels as a result of air quality standards. (Author abstract modified)

57586

APTIC NO. 76195

Cavanaugh, E. C., J. D. Colley, P. S. Dzierlenga, V. M. Felix, D. C. Jones, and T. P. Nelson

ENVIRONMENTAL PROBLEM DEFINITION FOR PETROLEUM REFINERIES, SYNTHETIC NATURAL GAS PLANTS, AND LIQUEFIED NATURAL GAS PLANTS (FINAL REPORT). Radian Corp., Austin, Tex., Environmental Protection Agency Contract 68-02-1319, Program Element 1AB013, Task 18, ROAP 21ADD-042, Rept. EPA-600/2-75-068, 454p., Nov. 1975. 142 refs.

Process descriptions for petroleum refineries, synthetic natural gas plants based on liquid hydrocarbon feedstock, and liquefied natural gas plants are given. These descriptions are compared with those for other types of energy conversion plants, such as coal gasification and liquefaction. Potential ambient air emissions, liquid effluents, and solid wastes are identified and monitoring method and control techniques for these emissions and wastes are discussed along with plant siting problems. (Author abstract)

57587

APTIC NO. 76516

Cesario, Frank J.

EMISSIONS IMPLICATIONS OF TRAFFIC REDUCTIONS. *J. Air Pollution Control Assoc.*, 25(9):957-958, Sept. 1975. 3 refs.

The emissions implications of traffic reductions are calculated using carbon monoxide as an example. As traffic volumes are reduced, the concomitant reduction in emissions due to congestion alleviation, when stated in terms of percentages of original emissions, increases to a maximum and then decreases. The shape of the emissions functions are exponential while the traffic volume reductions are linear. Initially the rate of change of the emissions rate is larger than that of traffic volume, while eventually the reverse becomes true.

57588

APTIC NO. 79828

Chang, T. Y. and B. Weinstock

CALCULATIONS OF INCREMENTAL EXPOSURE TO SULFURIC ACID FROM CATALYST-EQUIPPED VEHICLES. Preprint, Ford Motor Co., Dearborn, Mich., 22p., 1975. 18 refs. (Presented at the Air Pollution Control Association Section Meeting, Dayton, Ohio, Sept. 17-19, 1975.)

The Environmental Protection Agency's estimate of sulfuric acid concentrations near roadways is based on a highway air quality model which is a Gaussian dispersion model for calculating air quality near roadways. Analysis of the calculations indicates that the sulfuric acid concentrations on and near the highways may be overestimated by a factor of two to six because of the dominance of mechanical turbulence in the vicinity of the roadway. To estimate the daily human exposure to the incremental sulfuric acid concentrations, EPA coupled their dispersion model to a physical activity model for certain commuters. The incremental maximum 24-hour exposure of these commuters to sulfuric acid was estimated at 24 to 31 microgram/cu m under adverse meteorological conditions, when all vehicles are equipped with catalysts. This model increases the overestimate because the commuter experiencing these concentrations is presumed to be exposed for 2 hours daily to the highest concentration predicted for any part of his throughway travel, and because his residence is taken to be near a throughway. A carbon monoxide surrogate model based

on an EPA statistical study of CO aerometric data provides the most reliable estimate of incremental sulfuric acid exposure. Using the EPA physical activity model, a maximum incremental sulfuric acid exposure of 14 microgram/cu m for the commuter living near the throughway and 11 microgram/cu m for the commuter living away from the throughway is estimated. Lead and carboxyhemoglobin surrogate model estimates are consistent with the CO surrogate model estimates. (Author abstract modified)

57589

APTIC NO. 79760

Charlton, J., R. Sarteur, and J. M. Sharkey

IDENTIFY REFINERY ODORS. *Hydrocarbon Process.*, 54(5):97-100, May 1975. 9 refs.

The sources and identification of refinery odors are discussed. Refineries generally do not have a continuous odor problem. Most complaints are due to intermittent faults during plant operation. Sulfur compounds, particularly hydrogen sulfide and mercaptans, are the main source of odor from refineries. Unsaturated hydrocarbons are aromatic give odor problems but less frequently. Sulfur compounds can be determined down to 1 ppb using preconcentration techniques followed by gas liquid chromatography with a flame photometric detector. Hydrocarbons can be determined down to 1 ppm directly by gas liquid chromatography and down to 1 ppb if preconcentration is used. Odor panels should be used where an instrumental method is not available or to assist in maintaining good public relations in the refinery area.

57590

APTIC NO. 80288

Chavasse, C. G. R.

OBJECTIVES, MANAGEMENT, AND EFFECTS OF FOREST BURNING. *The Clean Air Society of Australia and New Zealand, Clean Air Conf. 1975 Proc., Rotorua, New Zealand, 1975, p. 92-113. 52 refs. (Feb. 17-21.)*

Emissions resulting from prescribed forest burning are discussed and compared with those from other sources. The total emission of carbon monoxide, hydrocarbons, nitrogen oxides, sulfur oxides, and particulates resulting from miscellaneous sources which include controlled and uncontrolled forest fires in the United States amounts to 37.0 million tons/yr as compared with 91.3 million tons from transportation, 41.4 million tons from stationary fuel combustion sources, 29.2 million tons from industrial processes, and 10.7 million tons from garbage incineration. Prescribed burning in the United States accounts for an estimated 2% of the particulate matter from all sources, and wildfires produce about 10% of the total. The atmospheric effects of prescribed burning are thus relatively small and can be minimized by correct management of burns and by cooperation between forest managers and meteorological services.

57591

APTIC NO. 81926

Chittaporn, P., V. A. Evans, E. Hartmann, D. M. Henze, F. J. Haughey, L. C. Memoli, J. A. Nobile, R. C. Scripsick, and J. R. Steimers

ENVIRONMENTAL MONITORING REPORT 1974. BROOKHAVEN NATIONAL LABORATORY. In: *Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 1, Energy Research and Development Administration, Washington, D. C., p. 397-489, 1975. 27 refs.*

NTIS: ERDA-54

Environmental monitoring activities at the Brookhaven National Laboratory are reviewed for the year 1974. The stack emission rate of particulates at a nearby steam plant was measured as 0.6 lb/million Btu which is about 600% above the emission standard. However, a calculation based on meteorological parameters indicates that at the site boundary the concentration of airborne particulates is 0.4 micrograms/cu m, about 0.5% of the yearly average ambient air quality standard. The calculated concentrations of sulfur dioxide and

nitrogen oxides emitted from the plant were both 0.002 ppm or 0.7% and 0.4% of their respective ambient air quality standards. Other than tritium, there was no indication of airborne contamination by radioactive effluents generated at the laboratory. The largest concentration of airborne tritium at the site boundary was 0.01% of the radiation concentration guide.

57592

APTIC NO. 90253

Click, C. N. and J. C. Reed

ATMOSPHERIC RELEASE OF HYDROGEN SULFIDE AND AMMONIA FROM WET SLUDGES AND WASTEWATERS. Preprint, Kellogg (M. W.) Co., Houston, Tex., R and ED Div. and Illinois Environmental Protection Agency, Springfield, DAPC, 21p., 1975. 31 refs. (Presented at the Complete Wastewater: Water's Interface with Energy, Air, and Solids National Conference, 2nd, Chicago, Ill., May 4-8, 1975.)

Although wastewater treatment involves considerable potential for the atmospheric release of hydrogen sulfide and ammonia, few wastewater installations cause odor nuisances or hazardous conditions. However, process upsets that produce unexpected conditions such as oxygen deficiency, flow stoppage, pH and temperature changes, unusual turbulence in sewers, and lack of proper ventilation may lead to nuisances or hazardous conditions. Two important conditions for sulfide release are the percent of the total sulfides present that are dissolved and the presence of oxygen or oxidized compounds in the system. The presence of oxygen usually prevents most H₂S release. Conversely the absence of oxygen virtually ensures that some H₂S will be released, the amount determined by the sulfide concentration, the pH, and the temperature. Atmospheric release of NH₃ from wastewaters is much less dependent on sudden changes in oxygen availability than is H₂S release, and pH changes become the usual controlling factor. Various aeration, desorption and stripping processes, and volatilization can all account for NH₃ emissions. Apparently NH₃ evolution from wastewaters is almost entirely dependent on the ammonia concentration, the pH, and the temperature. (Author abstract modified)

57593

APTIC NO. 76142

Cnsroe, T. J.

COMPARISON OF FOUR METHODOLOGIES TO PROJECT EMISSIONS FOR THE ST. LOUIS METROPOLITAN AREA (FINAL REPORT). Booz, Allen and Hamilton, Inc., Bethesda, Md., Office of Air and Waste Management Contract 68-02-1005, Rept. EPA-450/3-75-074, 50p., Oct. 1975. 6 refs.

NTIS: PB 247643/AS

A comparison of four alternate methodologies which are used to project air pollution emissions from stationary and mobile sources in the metropolitan St. Louis area is presented. Expected ambient air quality levels are also predicted by two of the four methods. Projection techniques which were developed as elements of specific studies of air pollution in St. Louis include: the St. Louis Trial Air Quality Maintenance Plan and Attainment of National Air Quality Standards for Carbon Monoxide and Oxidants in the St. Louis Air Quality Control Region. The other two projection methodologies were developed as general purpose emission projection models which may be applied to other geographic areas. These latter two methodologies are known as the Regional Emission Projection System and the Plan Revision Management System. The numerical projection results obtained with each method are presented for total suspended particulates, sulfur oxides, hydrocarbons, and carbon monoxide.

57594

APTIC NO. 84360

Constable, R. A. and H. F. Elkin

AVAILABILITY OF LOW AND SULFUR FUEL OIL. Air Pollution Control Assoc., Pittsburgh, Pa., Mid-Atlantic States Section, Air Pollution Control Assoc. Semi-Annu.

Tech. Conf. Proc. Sulfur Fuels - Problems Alternative Solutions, Wilmington, Del., 1975, p. 1-12. (April 25.)

Fuel oil availability in the United States is assessed. Presently, the United States is importing about 6 million barrels of oil a day or almost 40% of our requirements. Environmental regulations are greatly increasing the need for both low and high sulfur oil, with such measures being responsible for an additional 4 million barrels/day of import requirements in 1975. This figure includes 2.2 million barrels/day of increased oil demand resulting from automotive emission controls, delay in obtaining natural gas from Alaska, and replacement of coal with oil to meet sulfur emission standards. Gasoline desulfurization may incur still another fuel penalty of 0.3 million barrels/day. Although no oil supply problem currently exists in the traditional sense, demand increases as a result of the need to meet compliance deadlines as well as stepped up economic activity may require additional imports and increased prices.

57595

APTIC NO. 75978

Cowherd, Chatten, Jr., Mark Marcus, Christine M. Guenther, and James L. Spigarelli

HAZARDOUS EMISSION CHARACTERIZATION OF UTILITY BOILERS (FINAL REPORT). Midwest Research Inst., Kansas City, Mo., Environmental Protection Agency Contract 68-02-1324, Task 27, Program Element 1AB015, ROAP 21AUZ-002, Rept. EPA-650/2-75-066, 184p., July 1975. 41 refs.

NTIS: PB 245017/AS

A field sampling program aimed at quantifying potentially hazardous pollutants in the waste streams of a representative coal-fired utility boiler was conducted. The test facility was a 125-megawatt boiler at the Tennessee Valley Authority's Widows Creek steam electric generating station. The boiler was fired with pulverized coal and was equipped with a mechanical fly ash collector. Combustion products which were identified as potentially hazardous air pollutants included 22 trace elements, nitrates, sulfates, polynuclear compounds, and polychlorinated biphenyls. Fine particles were enriched with most of the trace metals, with the greatest degree of enrichment occurring for beryllium, cadmium, copper, and zinc. Fine particle enrichment correlated with the low removal efficiency of the fly ash collector. An acceptable mass balance was achieved for about half of the elemental pollutants.

57596

APTIC NO. 79233

Croke, Kevin G., Alan S. Cohen, and Bill Horowitz

THE RELATIONSHIP OF AUTOMOTIVE POLLUTANTS AND COMMERCIAL DEVELOPMENT. Preprint, Air Pollution Control Assoc. Pittsburgh, Pa., 14p., 1975. 9 refs. (Presented at the Air Pollution Control Association, Annual Meeting, 68th, Boston, Mass., June 15-20, 1975, Paper 75-22.6.)

Carbon monoxide levels were monitored and meteorological and traffic data collected at a strip retail commercial area and a small community central business district. A carbon monoxide dispersion model was used to estimate the air quality. Violations of the 8 hr carbon monoxide standard occurred at both sites. Assuming no increase in traffic, the CO 8 hr standards will still be violated in 1985. The air quality impact of such areas arises not from their associated parking or simply from the induced traffic caused by automobile traps to them. Their proximity to arterials and heavy reliance on on-street parking causes significant frictional delays of all traffic using adjacent streets. This effect lowers the average vehicular speed and thereby increases carbon monoxide emissions in the vicinity of the shopping area. The true air quality impact must therefore be measured with respect to such delay factors. Recommendations regarding the control of indirect sources not having significant adjacent parking facilities are presented. An induced-traffic/busiest-roadway screening process would be more effective than the present screening process using parking lot size. An alternative approach would make the local authorities in charge of roadway construction and repairs also

responsible for maintenance of air quality about the roadway. As such, environmental control agencies need only monitor these local authorities and check their roadway design criteria.

57597

APTIC NO. 80141

Curtis, Stanley E., John G. Drummond, Daniel J. Grunloh, P. Brendan Lynch, and Aldon H. Jensen

RELATIVE AND QUALITATIVE ASPECTS OF AERIAL ACTERIAL AND DUST IN SWINE HOUSES. *J. Animal Sci.*, 41(5):1512-1520, Nov. 1975. 34 refs.

The relative and qualitative aspects of aerial bacteria and dust in swine-houses were investigated. Aerial levels of bacterial-colony-forming particles (BCFP) less than 4.7 and 3.3 micron in aerodynamic diameter are significantly and positively correlated with total aerial BCFP level in swine-house air. Aerial BCFP and dust levels are significantly and positively correlated. There are fewer aerial BCFP/unit of aerial dust in a modified open front house than in enclosed houses. Nitrogen content in aerial dust in a swine finishing house in which a 13% crude protein (CP) diet was fed, averages 4.6%. Settled dust in a farrowing house in which a 12% CP diet is used, averages 23.3% CP whereas that in a room in which diets having 12-16% CO are prepared averages 13% CO. Much of the dust in swine-house air is feed dust. (Author summary modified)

57598

APTIC NO. 80187

Curtis, Stanley E., John G. Drummond, Keith W. Kelley, Daniel J. Grunloh, Vickie J. Meares, Horace W. Norton, and Aldon H. Jensen

DIURNAL AND ANNUAL FLUCTUATIONS OF AERIAL BACTERIAL AND DUST LEVELS IN ENCLOSED SWINE HOUSES. *J. Animal Sci.*, 41(5): 1502-1511, Nov. 1975. 28 refs.

Diurnal and annual fluctuations of aerial bacterial colony forming particles (BCFP) and dust levels in enclosed swine houses were investigated. Aerial levels were determined 44 or 48 times over 15 months in each of four enclosed and one modified open front University swine gestation and farrowing houses. Common logarithms of aerial BCFP levels (BCFP/cu m) for the five houses were 5.16 ± 0.06 , 4.88 ± 0.05 , 5.02 ± 0.06 , 4.99 ± 0.08 , and 4.33 ± 0.06 . These levels were comparable to those observed in 12 swine houses at five commercial swine operations. Common logarithms of dust levels (microgram/cu m) were 3.08 ± 0.05 , 3.03 ± 0.06 , 3.35 ± 0.05 , 3.03 ± 0.06 , and 2.89 ± 0.08 , respectively. These levels were generally lower than those observed in 11 houses at five commercial operations. Both aerial BCFP level and aerial dust level are significantly and negatively correlated with median outside temperature. (Author summary modified)

57599

APTIC NO. 75963

Darley, Ellis F. and Shimson L. Lerman

AIR POLLUTANT EMISSIONS FROM BURNING SUGAR CANE AND PINEAPPLE RESIDUES FROM HAWAII (FINAL REPORT). *California Univ., Riverside, Calif., Statewide Air Pollution Research Center, Office of Air and Waste Management Grant R800711, Rept. EPA-450/3-75-071, 29p., July 1975. 2 refs.*

NTIS: PB 244852/AS

Whole sugar cane, sugar cane leaf trash, and pineapple leaf trash from Hawaii were burned in an instrumented burning tower to determine the emission factors for particulate matter, carbon monoxide, and hydrocarbons. The average particulate, carbon monoxide, and hydrocarbon yields from whole cane were: 7.2, 70.6, and 10.4 lb/ton of fuel burned, respectively. The corresponding values for sugar cane leaf trash were 5.3, 59.4, and 8.4 lb/ton of fuel burned, respectively. The particulate, carbon monoxide, and hydrocarbon yields for pineapple trash ranged from 6.2-24.8 lb/ton, 87.4-131 lb/ton, and 3.2-12.8 lb/ton, respectively. Analyses of benzo(3,4)pyrene and the

trace metals beryllium, cadmium, chromium, copper, and nickel were also made for a few whole cane fires. Particle size distributions were determined in two cane leaf trash fires. The yields of pollutants from sugar cane agreed well with yields from a number of agronomic crops that were burned in the tower. The same was generally true for pineapple trash, except for slightly higher carbon monoxide yields than those from most other herbaceous fuels of comparable moisture content.

57600

APTIC NO. 83390

Detrie, J. P.

STUDY OF THE EVOLUTION OF COMBUSTION-PROVOKED POLLUTION IN FRANCE DURING THE 1972-1974 PERIOD. (*Etude de l'évolution de la pollution due à la combustion en France en 1972-73-74*). Text in French. *Pollut. Atmos. (Paris)*, 17(66):89-95, April-June 1975.

From 1972 to 1974 in all French cities there has been a decrease in black smoke and high acidity pollution, due to milder winters, improvements in combustion, and a reduction in the sulfur content of domestic fuel-oils. Increased emissions from high chimneys do not seem to have hampered this improvement. The reduction of high acidity pollution from 1963-64 to 1970 was 30-50%, depending on the city, followed by a 20-30% rise in 1971, and a 20-30% decrease in 1974. For black smoke, the 1963-64 to 1970 decrease was 30-60%, depending on the city, followed by a less marked fluctuation than for sulfur dioxide.

57601

APTIC NO. 82502

Dobos, I., V. Danila, and A. Lorinez

ASPECTS OF ATMOSPHERIC AIR POLLUTION WITH CARBON MONOXIDE IN AN OIL EXTRACTION AREA. (*Aspecte de poluare a aerului atmosferic cu monoxid de carbon intr-un bazin petrolifer*). Text in Rumanian. *Igiena (Bucharest)*, 24(2):115-118, April-June 1975.

The atmospheric concentration of carbon monoxide in an oil extraction area was investigated. The CO resulting from the underground combustion of oil and of accompanying gases accumulated in the atmospheric air in concentrations that exceeded by 41% the value of the maximal temporary admissible concentration. The values of CO were influenced by meteorological and geographical conditions that did not favor the self-purification of the air. This was accompanied by an increase in the blood carboxyhemoglobin in the population from the area.

57602

APTIC NO. 82425

Dominguez, George S.

AIR POLLUTION AND THE TEXTILE INDUSTRY. PART I. *Textile Ind. (Atlanta)*, 139(4):77,79,81,83,85,89-90,93-96, April 1975.

Air pollution problems in the textile industry are complex, and have not been fully surveyed. The scope of potential textile industry air pollution sources and the nature of possible contaminants are discussed, considering the fundamental materials and processes utilized in the industry. Both external emissions and in-plant atmospheric contamination are discussed. Heat, cold, and wave transmission are included as pollutants. Extrinsic factors affecting air pollution are discussed. The legal aspects of air pollution control are discussed, including the Occupational Safety and Health Act and the Clean Air Act. Both the basic legislation and the specific regulations for which it provides are amended periodically.

57603

APTIC NO. 82743

Dunbar, David R. and Edward J. Lillis

WIND EROSION AND AIR QUALITY CONTROL. Preprint, Environmental Protection Agency, Research Triangle Park, N. C., Reports and Analysis Section, 14p., Oct. 31, 1975. 4 refs. (Presented at the Wind Erosion Workshop and Research Review, Manhattan, Kans., Nov. 4-6, 1975.)

EMISSION SOURCES

57608

The effect of wind erosion on fugitive dust emissions were investigated at two agricultural sites. Suspended particulate concentrations averaged between 109 and 238 micrograms/cu m at the sites. Differences in the emission estimates at each site emphasized the nonuniformity of emissions from agricultural sites and the need for a more comprehensive technique such as the wind erosion method for estimating emission strength. Continuous cropping or the growing of an off-season crop was estimated to result in a 25% control efficiency. The Environmental Protection Agency has not yet implemented any fugitive dust control measures for agricultural related dust because the measures needed to attain air quality standards are considered to be socially disruptive and unreasonable and there is no guarantee that such measures would result in the National Ambient Air Quality Standards being achieved.

57604

APTIC NO. 84218

Elshout, A. J., R. Guicherit, J. van der Kooij, and J. Doelman
ON AIR POLLUTION BY NITROGEN OXIDES IN
NETHERLAND. (*Orands ni okeru chisso sankabutsu ni
yori taiki osen ni tsuite*). Text in Japanese. *Doryoku
(Power)*, 25(132):22-30, 1975. 15 refs.

Preparation is being made by the Netherlands Public Health Council to recommend atmospheric standards for nitrogen oxides to the Minister of Public Health and Environmental Hygiene at his request. Studies are being made on standards of nitrogen oxides and ozone, pollution sources of nitrogen oxides, and the effect of major parameters affecting emission of NOx from big boilers, and the possibility of suppressing emission of NOx from big boilers using gas as fuel. The first complaint on oxidant was made in 1965, in the western part of Netherlands, causing damage to agricultural and horticultural areas. Since then NOx and oxidant have been measured. In Rotterdam, NO2 concentration has been on the increase since 1966, with 38, 43, 43, 43, 45, and 44 ppm each year from 1966 to 1971. Ozone is generated in extensive areas simultaneously from chemical reaction, and also possibly comes from areas from outside the country. Although data on NOx was collected by types of combustion equipment and by types of fuels, no definite information was obtained concerning contributions by stationary combustion equipment, chemical plants, or transportation means to air pollution, because emission density distribution varies according to sources, composition, and heights. Both technical and economic examination must be continued as to emission from various sources. Emission of NOx from stationary sources with natural gas fuel must be given special consideration. From home water heaters, with less than 100 MW input of heat, 50g/GJ NOx (in terms of NO2) is emitted. The average emission of NOx from bigger boilers (thermal power generation stations) reaches average 150g/GJ, but this is less than what is emitted in the U. S. By two-stage combustion of many boilers, or low excess air combustion, emission of NOx may be drastically cut, which may be applicable to thermal power station.

57605

APTIC NO. 76372

Faulring, G. M., W. D. Forgeng, E. J. Kleber, and H. B. Rhodes

DETECTION OF CHRYSOTILE ASBESTOS IN AIRBORNE DUST FROM THERMOSETTING RESIN GRINDING. *J. Test. Eval.*, 3(6):482-490, Nov. 1975. 9 refs.

Airborne dust samples generated during grinding thermosetting resin plaques containing 0.8 to 18% chrysotile and reference samples were examined optically and on the electron microprobe up to magnifications of 900 times. No free fibers of chrysotile were detected in dust collected from 0.8% chrysotile-polyester plaques. Only a low level concentration is found in dust from 4-18% chrysotile polyester plaques. The difference in texture of chrysotile and cellulose ester membrane filters is emphasized by vacuum deposition of aluminum and carbon. Electron microprobe methods are presented that distinguish between chrysotile completely encapsulated in

resin and chrysotile with a free surface. The airborne chrysotile in the grinding dust is nonfibrous, encapsulated in resin, and closely associated with other materials. The number of chrysotile fibers with a free surface varies from zero to 2/1000 dust particles. (Author abstract modified)

57606

APTIC NO. 81519

Fay, James A.

PREDICTING URBAN AIR QUALITY - A MACRONALYSIS OF POLLUTION CONTROL STRATEGIES. In: *The Automobile and the Regulation of Its Impact on the Environment*. Norman, Okla., Oklahoma Univ. Press, 1975, Chapt. 3, p. 67-113. 68 refs.

The intensity and extent of automotive pollutants in the United States are estimated in terms of ambient concentrations of carbon monoxide, non-methane hydrocarbons, and nitrogen oxides in urban regions and in terms of the number of people exposed to various pollutant levels. A simple meteorological model is used to permit aggregating population exposure over all of the cities in the United States. Future changes in the extent and intensity of these primary automotive pollutants are then estimated by a rollback calculation which assumes ambient levels proportional to emissions based on possible future nationwide emission control strategies. At 200,000 fewer people are expected to suffer exposure to pollutant levels exceeding the National Ambient Air Quality Standards if a uniform nationwide reduction in primary pollutant emissions of 1% is achieved.

57607

APTIC NO. 80322

Feeney, P. J., T. A. Cahill, R. G. Flocchini, R. A. Eldred, D. J. Shadoan, and T. Dunn

EFFECT OF ROADBED CONFIGURATION ON TRAFFIC DERIVED AEROSOLS. *J. Air Pollution Control Assoc.*, 25(11):1145-1147, Nov. 1975. 10 refs.

The contributions of traffic to particulate matter in near roadway locations were investigated. Aerosols present upwind and downwind of freeways in the Los Angeles Basin were collected in five particulate size ranges by Lundgren impactors with after filters and analyzed for elemental content by ion excited X-ray emission. The contribution of freeway traffic to total airborne particulate load was obtained by subtracting the local background, measured by an upwind sampler, from the values obtained by downwind samplers on a size by size, element by element basis. This contribution correlated reasonably well with estimates derived from automotive and roadbed expendable rates. Traffic derived aerosols, normalized to vehicular flow, were considerably lower in mass downwind of depressed roadbed configurations than either at grade or raised configurations. A line source model, combined with literature values for emitted Pb, produced good agreement with results obtained in the configuration at the grade. (Author abstract)

57608

APTIC NO. 83158

Fichtel, Konrad

PYROLYSIS OF DOMESTIC WASTES. FOUR METHODS ARE READY FOR TRIAL. (*Heusmuell-Pyrolyse. Vier Verfahren koennen erprobt werden*). Text in German. *Umwelt (Duesseldorf)*, 5(4):42-49, Aug. 1975. 17 refs.

Four pyrolytic techniques are described for the disposal of solid municipal wastes in conjunction with degasification (Destrugas) or gasification (Landgard, Andco-Torrax, Purox). The Landgard technique incinerates waste in a rotating furnace by hot gases of oil burners and air with free thermal energy directed to residue pyrolysis. The direct-current Andco-Torrax method with slag granulate discharge burns and gasifies unreduced wastes in air at 1200 C. In the Destrugas technique wastes sink below and are subjected to drying and heating at decomposition temperatures. With the Purox method oxygen blasts react with hydrocarbon compounds predominantly during carbon monoxide formation and the resulting heat acts to melt inorganic substances. These heat treatments produce

residues of various qualities, wherein volume reduction for incineration is 85-90%, for Destrugas 85%, for Landgard 90%, and for Torrax and Purox 97%. Direct current degasification associated with cracking has proven to be advantageous in clean air maintenance and in the energy sector.

57609

APTIC NO. 75946

Field, D. E., R. C. Barley, F. B. Higgins, Jr., J. A. Lee, R. Newirth, and J. W. Pervier

ENGINEERING AND COST STUDY OF AIR POLLUTION CONTROL FOR THE PETROCHEMICAL INDUSTRY VOLUME 6: ETHYLENE OXIDE MANUFACTURE BY DIRECT OXIDATION OF ETHYLENE. *Air Products and Chemicals, Inc., Marcus Hook, Pa., Houdry Div., Environmental Protection Agency Contract 68-02-0253, Rept. EPA-450/3-73-006-1, 97p., June 1975. 15 refs.*

NTIS: PB 244116/AS

The ethylene oxide industry has been studied to determine the extent of air pollution resulting from the various plants and processes of the industry. There are distinct differences in the two types of oxidation processes; one has nitrogen as the major constituent of its vent gas, and the other has carbon dioxide as the major constituent of its vent gas. The air emissions from all variations of the direct oxidation process are chiefly hydrocarbons: ethylene, ethylene oxide, and traces of ethane from the feed gas. Some plants report traces of nitrogen oxides or sulfur oxides from combustion operations. Considering that only some plants employ control devices, 1973 emission factors are estimated at 0.0287 lbs/lb ethylene oxide produced for air oxidation and 0.0124 lbs/lb ethylene oxide produced for oxygen oxidation. Oxygen oxidation plants can reduce their emissions by one of several incineration techniques. Whether or not they recover the available energy will be dictated by the economics and process considerations in each instance. None of the pollution control devices studied can be deemed a financial hardship. Capital and operating costs are discussed for both types of plants. Air oxidation process plants can reduce emissions and conserve fuel with a catalytic converter and gas turbine on their main process vent. Oxygen oxidation plants could incinerate their main process vent in standard types of units. Catalyst improvement and inhibitor modification could simplify control techniques by reducing the volume of carbon dioxide emitted. (Author abstract modified)

57610

APTIC NO. 83392

Fifis, C.

THE III. ENERGY. III-1. TECHNICAL AND LEGISLATIVE ASPECTS. CONNECTION WITH POLLUTION. (III. Energie. III-1. Aspects techniques et réglementaires. Lien avec la pollution). Text in French. *Ingrs. Automobile (Paris), no. 11:400-405, Nov. 1975.*

The close relation in fuel-oil motors between carburetion, fuel consumption, and the need for modification of the engine decrease consumption are discussed. It is possible to produce economical engines which are in accordance with air and noise pollution norms and which present no mechanical inconveniences. In Sweden, where the 1973 American pollution norms are being followed, new motors are being produced with doubtful carburetion developments and significantly increased consumption.

57611

APTIC NO. 80168

Fishbein, Lawrence

ATMOSPHERIC MUTAGENS. *Preprint, International Congress of Scientists on the Human Environment, p. 59, 1975. (Presented at the International Congress of Scientists on the Human Environment, Kyoto, Japan, Nov. 17-26, 1975.)*

The primary agents reviewed are the halogenated hydrocarbons, such as fluorocarbons, vinyl chloride, trichloroethylene,

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tetrachloroethylene, carbon tetrachloride, and chloroprene. Other mutagenic agents considered include sulfur oxides, nitrogen oxides, polynuclear aromatic hydrocarbons and peroxyacyl nitrates, and miscellaneous oxygenated derivatives. An attempt is made to show the major sources of chemical mutagens in the atmosphere, their stability, transport, possible aspects of their synergistic and health effects, as well as mutagenic activity in various test systems.

57612

APTIC NO. 83304

Fitzer, Erich and Dieter Siegel

THE EMISSION OF NITRIC OXIDE BY INDUSTRIAL FIRING SYSTEMS IN DEPENDENCE OF THE OPERATING CONDITIONS. (*Stickoxid-Emission industrieller Feuerungsanlagen in Abhängigkeit von deren Betriebsbedingungen*). Text in German. *Chem.-Ing.-Tech., 47(13):571, 1975. 3 refs. (The full-length text can be obtained from: Verlag Chemie GmbH, D-6940 Weinheim, Postfach 1260, West Germany).*

The influence of different factors on the nitrogen oxides concentration of the flue gas emissions of a tubular furnace of a petroleum refinery and of a thermal power plant was studied by concentration measurements by means of chemiluminescence analyzers. The measurement was done at the stack base after the tubular furnace and after the electrostatic precipitator in the power plant. The measurements revealed definite dependences of the nitrogen oxides emissions on the kind of the fuel, furnace construction, temperature, and air-excess coefficient. As the concentrations were confined to a rather uniform range regardless of different air-excess coefficients, fuels, and furnace designs, the combustion chamber temperature had a dominant influence on the emissions. The emissions can be abated by proper choice of fuel and by appropriate furnace operation.

57613

APTIC NO. 81829

Fix, Jack J.

ENVIRONMENTAL SURVEILLANCE AT HANFORD FOR CY-1974. *In: Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 2, Energy Research and Development Administration, Washington, D. C., Rept. BNWL-1910, UC-41, p. 1065-1134, 1975. 18 refs.*

NTIS: ERDA-54

Environmental monitoring data obtained at the Energy Research and Development Administration's Hanford nuclear facility are presented for the year 1974. The highest yearly average concentration of nitrogen dioxide measured was 0.006 ppm, or 12% of the ambient air standard of 0.05 ppm. All sulfur dioxide measurements were less than the detection limit of 0.005 ppm, or 25% less than the ambient air standard of 0.02 ppm. Suspended particulate values fluctuated widely due to occasional heavy dust storms; the average annual value was 57 micrograms/cu m.

57614

APTIC NO. 83936

Fleskes, H.

THE POWER AND HEAT SUPPLY BY THE UTILITIES COMPANY HANNOVER AG. (*Ausbau der Strom- und Fernwaermeversorgung bei den Stadwerken Hannover AG*). Text in German. *Energie (Munich), 27(11):287-295, 1975. 4 refs.*

The development of municipal electrical and steam power plants in Hannover are discussed with respect to structural remodeling. In two inner city power stations, which use principally natural gas, boiler towers with three smokestacks have improved air cleanliness considerably. The arrangement and construction of the sections of the new Herrenhausen power station are examined at length as are its heating cycle, steam boiler, pumps, feedwater heaters and fuel supply. Centralized controls for measuring, monitoring and protecting boiler operations are described along with electrical plants. In conclusion,

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the advantages of a joint corporation, Hannover-Braunschweig AG, are considered.

57615

APTIC NO. 83505

Freour, P. and J. R. Pierron

ASBESTOS AS AN AIR POLLUTANT. ITS ROLE IN HUMAN PATHOLOGY. (*L'asbeste, composant de la pollution atmospherique. Son role en pathologie humaine.*) Text in French. Bull. Acad. Nat. Med. (Paris), 159(3):271-275, March 18, 1975. 20 refs.

Asbestos fibers are air pollutants, especially concentrated in large industrial cities. The presence of a high concentration of asbestos dust around asbestos producing and using plants has been determined; the dust concentration decreases further away from the installation but can spread out over large distances. Cities without polluting industries and even households and rural areas have asbestos in their atmospheres from sources such as clutch and break wear and the use of paints and isolants containing asbestos. Asbestos fibers have been found in the lungs of city dwellers as well as professionally exposed men. Constant exposure of rats to chrysotile asbestos dust has been shown to lead to bronchial tumors in 18.9% of cases. A 20-year study of 623 New Yorkers has shown a statistically significant increased death rate (6.8 times greater than for the total population) for subjects living in an asbestos polluted atmosphere. There are a number of unanswered questions about the carcinogenic action of asbestos. Some think that the fibers themselves constitute a chronic mechanical irritant leading to a metaplasia which will eventually reach a malignant stage. Others believe that asbestos fibers probably become carcinogenic when combined with other factors such as cigarette smoke.

57616

APTIC NO. 79230

Freudenthal, Peter C.

NEW YORK CITY AIR QUALITY AND THE 1973-74 OIL EMBARGO. Preprint, Air Pollution Control Assoc., Pittsburgh, Pa., 18p., 1975. 3 refs. (Presented at the Air Pollution Control Association Annual Meeting, 68th, Boston, Mass., June 15-20, 1975, Paper 75-08.5.)

A significant change in sulfur dioxide emission patterns in New York City occurred during the winter of 1973 and 1974 when, because of the Arab fuel embargo, there were insufficient supplies of low sulfur oil for electric generation. Utility SO₂ emissions, normally about 41% of the city's total, increased by 57% during December 1973 to April 1974 as compared to these months of the previous year. Although meteorological dispersion conditions were slightly less favorable than during the previous winter, and in spite of the increase in utility SO₂ emissions, ambient SO₂ levels showed no significant change when compared to the previous winter. Mathematical modeling indicates that because of the utility's tall stacks, the large increase in utility SO₂ emissions produced too small a change in air quality to detect by standard statistical methods. The usefulness of reserving low sulfur oil for low stacks during a fuel emergency was demonstrated. (Author abstract modified)

57617

APTIC NO. 83724

Fujii, M.

BENZO(3,4)PYRENE CONTINUED. (*Zoku 3,4-benzopyrene*). Text in Japanese. Nippon Yakuzaishikai Zasshi (J. Japan Pharm. Assoc.), 27(12):997-1004, 1975.

Benzo(3,4)pyrene is used as an index of air pollution by polycyclic hydrocarbons. Although there is much data on concentrations of benzo(3,4)pyrene in air, they are not consistent. Generally, the concentration of benzo(3,4)pyrene in air shows a gradual decrease, while there has been a 3 to 4-fold increase of lung cancer in the last decade. The cause of the decrease of benzo(3,4)pyrene in air is described and the maximum allowable concentration of work places is quoted.

57621

APTIC NO. 83364

57618

Fujii, T.

PROBLEMS CONCERNING MONOMERIC VINYL CHLORIDE. (*Enka biniru monomer ni kansuru shomon-dai*). Text in Japanese. Kankyo Gijutsu Kenkyukai Kenkyu Shiryō (Environmental Conserv. Eng. Assoc. Rept.), 4(12):862-867, Dec. 1975. 24 refs.

The chance of exposure to vinyl chloride monomer has increased not only to employees in vinyl chloride factories and polyvinyl chloride factories, but to the general population, owing to rapidly increasing production. The physical properties, and production of vinyl chloride monomer and PVC, their acute and chronic toxic effects, and the carcinogenicity of vinyl chloride monomer are reviewed. The problems of vinyl chloride monomer, especially those of air pollution (its release from vinyl chloride factories into the atmosphere) and of the residual monomer in PVC which is freed from PVC when heated are discussed. The carcinogenicity of ultra-low but chronic concentration exposures to the monomer, and methods of detecting and determining minute concentrations are discussed.

57619

APTIC NO. 82269

Fukuzaki, Norio and Ryuichi Sugai

MEASUREMENTS OF PARTICULATE FLUORIDES IN NIIGATA PREFECTURE; CHEMICAL COMPOSITION. (*Niigata-kenka ni okeru ryushijo fukkabutsu chosa, funjin no souseibunseki*). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):339, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 83.)

The chemical composition analysis of airborne dust collected at aluminum refining plants, phosphatic fertilizer plants, and stainless steel plants was done by the X-ray diffraction technique. The sample dust was collected on a millipore filter, or the adsorbed dust within chimneys was collected for analysis. Most of the particle fluorides emitted from aluminum refining factories were sodium aluminum fluoride. Aluminum hexafluorosilicate was not removed by a cleaning tower at the phosphatic fertilizer manufacturer and emitted as the main component of its dust. No particle fluoride could be detected from the stainless steel manufacturer, and ammonium chloride was the major component of its dust.

57620

APTIC NO. 83527

Gatz, Donald F.

POLLUTANT AEROSOL DEPOSITION INTO SOUTHERN LAKE MICHIGAN. *Water, Air, Soil Pollut.*, 5(2):239-251, Dec. 1975. 33 refs.

The atmospheric input of urban elemental emissions and their wet and dry deposition in southern Lake Michigan were studied. Observed elemental concentrations in urban air were used to calculate emissions and recently measured wet and dry deposition parameters were used to calculate deposition. Atmospheric inputs of iron, lead, titanium, and vanadium were sizable fractions of total lake input of these metals. Wet and dry inputs from the atmosphere were about equal. Between 3 and 15% of elemental pollutant emissions from Chicago and NW Indiana entered the Lake. This fraction increased with particle size. (Author abstract modified)

57621

APTIC NO. 80367

Gilmore, Forrest R.

THE PRODUCTION OF NITROGEN OXIDES BY LOW-ALTITUDE NUCLEAR EXPLOSIONS. *J. Geophys. Res.*, 80(33):4553-4554, Nov. 20, 1975. 5 refs.

Hydrodynamic and chemical kinetic calculations are used to show that megaton nuclear explosions near the ground produce, in the air that is shocked above 2200 K and quickly cooled by expansion, 0.8 times 10 to the 32nd power nitric oxide molecules/megaton. The air inside this region is still so

hot that further production or destruction of NO may take place. An upper limit to the production is obtained by assuming that the hot inner air mixes with undisturbed air, producing an additional 0.7 times 10 to the 32nd power NO molecules/megaton, giving a total of 1.5 times 10 to the 32nd power NO molecules/megaton. A lower limit is obtained by assuming that during the fireball rise all of the shocked air containing NO is entrained and mixed into the hotter air, and slow cooling of the mixture reduces the total NO to 0.4 times 10 to the 32nd power molecules/megaton. (Author abstract)

57622

APTIC NO. 76420

Goebel, W.

PROPAGATION OF ODORS. (Geruchsausbreitung). Text in German. Schweiz. Tech. Z., no. 43:993-995, Oct. 1975. 4 refs.

A nomogram for the determination of the propagation of malodorous emissions from livestock farming facilities, and recommendations for the abatement of such emissions are presented. The dilution factor necessary to minimize the zone in which odor is perceptible around such facilities can be substantially reduced by ventilation of the liquid manure, by the use of oxidation ditches, ultraviolet irradiation of the waste air, air scrubbing, and peat filter. The waste air should be discharged at great altitude and at high speed, and it should be diluted with fresh air at the discharge opening.

57623

APTIC NO. 76635

Gofmekler, V. A., L. E. Bepal ko, L. D. Rusalenko, and M. V. Fokin

ENGINE EXHAUST GASES AS POSSIBLE AIR POLLUTANTS INSIDE CABINS OF SEA BOATS. (Vykhopnye gazy dvigateley kak vozmozhnyy istochnik zagryazneniya vozdukhnoy sredy bytovykh pomeshcheniy morskikh sudov). Text in Russian. Gigiena i Sanit., no. 9:104-105, 1975. 2 refs.

Diesel engine exhaust as a possible source of air pollution inside cabins of sea boats was studied in cabins with forced and natural ventilation. The distance between the air intake and the exhaust pipe was 5.5-6 m vertically, and 3-3.5 horizontally. The overall pollution level due to carbon monoxide, hydrocarbons, and nitrogen oxides, measured inside the cabin, exceeded the maximum allowable level by 2.2-2.3 times, especially when the artificial ventilation was on. A survey among the crew members revealed complaints about air pollution in 21.1%, and about recurrent headaches in 19.3%. The air pollution inside the cabins, associated with high air temperature, was found to cause functional changes in the central nervous system, cardiovascular system, and in respiration.

57624

APTIC NO. 80196

Gonsior, H.

TRAFFIC AND THE ENVIRONMENT. (Verkehr und Umwelt). Text in German. Technik (Berlin), 30(7):470-471, July 1975. 7 refs.

General problems of noise and air pollutant emissions from motor vehicles, and measures taken or planned to abate such emissions in East Germany are discussed. The replacement of streetcars in certain towns has resulted in a noise abatement at the expense of increased exhaust emissions. The lead and oil content in automobile fuel has been limited, and it is prohibited to unnecessarily idle automobiles.

57625

APTIC NO. 82249

Goossens, W. R. A.

THE TOTAL SULFUR EMISSION OF THE BELGIAN POWER PLANTS FOLLOWING THE FUEL OIL SHORTAGE. (De totale zwavelemissie van de Belgische centrales na de crisis in de stookoliebevoorrading). Text in Flemish. Ingenieursblad, 44(10):237-240, May 16, 1975. 9 refs.

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According to calculations, the year 1980 will set a record in sulfur dioxide emissions in Belgium. This prediction is based upon an annual energy growth of 8.2% during the 1970's and 7.3% during the first five years of the 1980's. Although nuclear energy will increase from 2.3% in 1970 to 24.8% in 1980 and then to 51.7% in 1985, the consumption of natural gas will double in the decade following 1980, the use of oil will reach its maximum by 1980, and coal consumption will drop slightly. While nuclear energy and natural gas combustion do not produce sulfur dioxide, the coal burned in Belgium averages 1.12% sulfur, equivalent to 1.6 kg S/G cal and 7000 kcal/kg. The sulfur content of the petroleum burned in Belgium averages 3.35%, i.e., 3.5 kg S/G cal or 9750 kcal/kg. The total sulfur dioxide emissions from Belgian power plants in 1979 should be 7% higher than those of 1973, provided the expected developments in desulfurization are realized.

57626

APTIC NO. 79611

Grad, Frank, Albert J. Rosenthal, Richard Hsia, Stephen R. Munzer, and Stephen L. Schwarz

THE AUTOMOBILE AND THE REGULATION OF SOME OF ITS NON-EXHAUST IMPACTS ON THE ENVIRONMENT. Columbia J. Environ. Law, 1(2):187-233, Spring 1975. 193 refs.

Noise, water pollution, and solid waste problems associated with the automobile are discussed. Control of mobile sources of air pollution need not conflict with noise reduction goals. The Wankel rotary engine not only holds promise for meeting the Clean Air Act standards but, in addition, possesses a low noise potential. While converting noxious fumes into innocuous gases, a catalytic muffler will at the same time assist the regular muffler. Inspection programs testing exhaust emissions could also test noise level.

57627

APTIC NO. 76384

Grimmer, Gernot and Armin Hildebrandt

INVESTIGATIONS ON THE CARCINOGENIC BURDEN BY AIR POLLUTION IN MAN XIII. ASSESSMENT OF THE CONTRIBUTION OF PASSENGER CARS TO AIR POLLUTION BY CARCINOGENIC POLYCYCLIC HYDROCARBONS. (Untersuchungen ueber die karzinogene Belastung des Menschen durch Luftverunreinigung XIII. Ermittlung der Anteile der Personenkraftwagen an der Luftverunreinigung durch karzinogene polyzyklische Kohlenwasserstoffe). Text in German. Zentralbl. Bakteriol. Hyg., Infektionskr. Abt. Orig. B, 161(2):104-124, 1975. 11 refs.

A total of 100 passenger cars selected to represent those in widest use were tested with respect to aromatic hydrocarbon (PAH) emissions, using the EUROPA-Test, which simulates city driving. The total amount of selected 14 PAH emitted by all test vehicles is in the range of 1-16 mg. As can be seen from the average of fuel consumption (409.4 g/E-test) and benzo(a)pyrene emission (41.6 microgram/E-test), 1000 kg of burned fuel will yield 101 mg of benzo(a)pyrene. Based on the consumption of gasoline in 1973 in West Germany (18,508,200 ton), an annual amount of 1.85 ton of benzo(a)pyrene is produced by gas burning vehicles. However, the biological effect of the automobile exhaust gas is still greater because it contains additional carcinogenic PAH. A statistical evaluation shows that different car models cannot be distinguished by their PAH emissions. When evaluating individual vehicles after 5 repeated E-tests, the margin of error for any single PAH is between 6.3-10.9% (variation coefficient). A larger margin of error is obtained by pooling 5 different vehicles of the same model.

57628

APTIC NO. 73255

Guicherit, Robert, Ank Hoogeveen, and Finn Lindqvist

THE ORIGIN OF C1-C5 HYDROCARBONS IN THE HAGUE AND IN DELFT. (Die Herkunft von C1-C5-Kohlenwasserstoffen im Haag und in Delft). Text in German. Staub, Reinhaltung Luft, 35(3):89-95, March 1975. 10 refs.

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Systematic measurements of the C1-C3 hydrocarbons, carbon monoxide, and lead in The Haag and in Delft were taken to determine the origin of the hydrocarbons. As revealed by automotive exhaust emission measurements, the methane content is 150 to 200% of the acetylene content, the ethane content is about 20% of the acetylene content, and the propane content is about 0.2% of the acetylene concentration. Both the CO and total nitrogen oxides concentrations were a function of the driving pattern. Measurements in the Hague revealed high concentrations of methane, ethane, and propane, and no correlation of these levels with the traffic-specific acetylene concentrations, indicating that these hydrocarbons originate from sources other than traffic. Traffic is the almost exclusive source of lead and acetylene in Delft, and ethylene, propene, butane, and pentane originate mainly from a nearby photochemical plant. The considerable variations of the hydrocarbon concentrations as a function of wind direction also indicate the contribution of natural gas leaks, as well as chemical and petrochemical plants, to the overall hydrocarbon concentrations.

57629

APTIC NO. 83960

Gundersen, Nils, Ludvig Daac, Holand Wannag, and Axel Wannag

LEAD ANALYSIS IN SOIL SAMPLES FROM KINDERGARTENS IN BAERUM. (*Blyanalyser i jord fra barnehaver i Baerum*). Text in Norwegian. *Tidskr. Nor. Laegeforen.*, 95(1):29-30, 1975.

Soil samples taken from the surface and 10 cm depth in the yards of four kindergartens in Oslo were analyzed for lead content. Two of the kindergartens could be suspected to have contaminated soil in their yards due to their proximity to roads with busy traffic, but the other two were rather far away from any such roads. The average lead concentrations in the surface layer of the soil ranged from 16 to 30 micrograms/g in the four kindergartens, and samples taken from 10 cm depth contained 14-27 micrograms of lead per g of soil. The findings do not show any significant difference in the lead contents of the soil as a function of the distance from roads.

57630

APTIC NO. 82618

Gunn, Samuel A., James R. Harr, Orville A. Levander, Oscar E. Olson, and Harold J. Schroeder

SELENIUM. *National Academy of Sciences, Washington, D. C., Subcommittee on Selenium, Environmental Protection Agency Contract 68-02-1226, 316p., 1975. 860 refs.*

An attempt is made to assemble, organize, and intercept present-day information on selenium and its compounds, and the effects of these substances on man, animals, and plants. The chemistry, occurrence, industrial and agricultural uses, and cycling of selenium are discussed. It is estimated that 2.4 million lb of selenium was discharged by industrial plants in 1970. Burning of coal accounted for 62% of the total, and production of copper for 26%. The remainder was about equally divided among selenium recovery plants, glass manufacturing, and the burning of fuel oil. If estimates are correct, the amounts of selenium emitted from industrial sources into the air are small in comparison with the amounts of other industrial pollutants emitted. Industrial emissions of selenium probably occur as finely divided solid particulates. Emphasis is given to the effects of selenium on man. The biologic effects discussed involve nutrition, reproduction, the vascular system, selenosis, selenium poisoning, carcinogenesis, the physiologic role, and human medical uses. Methods for sampling and analysis are also discussed. The chemical forms of selenium liberated by combustion are either insoluble or are bound tightly by soil colloids. It is difficult to assess the potential harm of airborne selenium, since practically nothing is known concerning the toxicity or metabolism of selenium compounds taken in via the lungs. Selenium has several profound metabolic interactions with other elements of ecologic concern, such as mercury, cadmium, and arsenic. These interactions can be beneficial under some conditions, but under other conditions they are distinctly harmful. (Author abstract modified)

57631

APTIC NO. 84420

Hall, R. H. and W. Krawciw

SENSORY POLLUTION AND THE PETROLEUM INDUSTRY. *IPIECA, Petrol. Environ. Conserv. Symp. Rep., Tehran, Iran, 1975, p. 313-356. 22 refs. (April 7-9, Paper 11.)*

Sensory and visual pollution in the petroleum industry is discussed. Odors are characterized by detectability, intensity, quality, and acceptability. Sour natural gas containing hydrogen sulfide represents a large inventory of odorous material and care must be taken in gathering systems and in processing plants to avoid leaks. Atmospheric haze or decrease in visual range is caused by particulate matter which is often fine droplets of water. Hygroscopic condensation nuclei are formed when sulfur dioxide is exposed to sunlight and ionized. Nitrogen oxides behave similarly. Aerosols are produced from hydrocarbons by polymerization due to photochemical reactions.

57632

APTIC NO. 80039

Hammerle, Robert H. and William R. Pierson

SOURCES AND ELEMENTAL COMPOSITION OF AEROSOL IN PASADENA, CALIF., BY ENERGY-DISPERSIVE X-RAY FLUORESCENCE. *Environ. Sci. Technol.*, 9(12):1058-1068, Nov. 1975. 52 refs.

A 29-day study was performed to identify sources of atmospheric particulate matter and assess their contribution to the aerosol in Pasadena, California. Size fractionated and unfractionated filter samples were collected automatically and were analyzed by an automatic X-ray fluorescence spectrometer. Nine elements proved consistently measurable with reasonable accuracy: calcium, titanium, vanadium, manganese, iron, nickel, zinc, bromine, and lead. All show orders-of-magnitude fluctuations, with a tendency to follow diurnal patterns related to meteorological factors. Most of the elements can be classified as small particle elements (Ni, Zn, Br, Pb) or large particle elements (Ca, Ti, Mn, Fe), with V falling in an intermediate size range. Statistical analysis of interelement correlations and size distributions indicates that gasoline engine exhaust is the source of the Br and Pb; soil from the basin is the main source of the Ti, Mn, and Fe; much of the Ca probably is from cement dust contamination of the soil, and the rest of the Ca is indigenous to the soil. The average correlation coefficient for elements from a source in common was 0.8. Elements unrelated by source are still correlated, with an average coefficient of 0.4. The soil contributed an estimated 8 microgram/cu m and the primary exhaust particulate from gasoline engines contributed 5 microgram/cu m, on the average, to the aerosol mass at the Pasadena site.

57633

APTIC NO. 79764

Handy, R. L., J. M. Hoover, K. L. Bergeson, and Darwin E. Fox

UNPAVED ROADS AS SOURCES OF FUGITIVE DUSTS. *Transp. Res. News*, no. 60:6-9, Autumn 1975. 7 refs.

The amount, distribution, and mineralogy of dustfall near several unpaved roads were investigated. Dust collectors were set along lines transverse to the centerline of 10 unpaved roads and test sections in central and eastern Iowa. Measurements of 3.22, 32.7, 33.3, and 30.2 kg/ha/mo are found in the four most distant containers. Half (325,000 kg/km) of the annual dust along three limestone surface aggregate roads and four mixed in place soil aggregate road test sections was limestone. The percentage of carbonates vary from 75 to less than 1%, generally decreasing with increasing distance from the road. Additive aggregate and mixing it in rather than leaving it on the road surface reduces dusting by a factor of 10. Addition of 1% lignin further reduces dusting by one-half.

57634

APTIC NO. 76520

Hanna, Steven R. and Franklin A. Gifford

METEOROLOGICAL EFFECTS OF ENERGY DISSIPATION AT LARGE POWER PARKS. *Bull. Am. Meteorol. Soc.*, 56(10):1069-1076, Oct. 1975. 34 refs.

The dissipation of waste energy from large power parks may result in significant meteorological effects. The rate of atmospheric dissipation of the waste energy from these power parks is approximately equal to the atmospheric dissipation of energy by geophysical phenomena such as thunderstorms, volcanoes, and large bushfires. Vortices are predicted around power parks. The plume rise from 50 towers is estimated at more than 110% of that from a single tower if the tower spacing is less than about 300 m. Excess fog will occur about 1 or 2% of the time at locations within 100 km of the cooling towers. Drift deposition of water would average about 0.4 cm/yr at distances from 2 to 4 km from the towers. (Author abstract modified)

57635

APTIC NO. 76000

Hare, Charles T.

METHODOLOGY FOR DETERMINING FUEL EFFECTS ON DIESEL PARTICULATE EMISSIONS (FINAL REPORT). Southwest Research Inst., San Antonio, Tex., Environmental Protection Agency Contract 68-02-1230, Program Element 1AA002, ROAP 26AAE-19, Rept. EPA-650/2-75-056, 200p., March 1975. 9 refs.

NTIS: PB 245163/AS

A method for evaluating fuel and fuel additive effects on diesel engine particulate emissions was developed. A two-cycle engine and a four-stroke cycle engine were operated in both individual steady-state modes and according to a variation of the 13-mode diesel emissions measurement procedure. Both engines were operated on three fuel types, each of which was used with one of two diesel fuel additives as well as by itself. The primary particulate sampling technique employed was a dilution tunnel. Secondary evaluation techniques included a diluter-sampler, a light extinction smoke meter, and a filter-type sampling smoke meter. Particulate mass rates were calculated from gravimetric data. The chemical analyses included: sulfur, carbon, hydrogen, and nitrogen in particulate; total organic solubles; sulfur, carbon, hydrogen, nitrogen, and oxygen in organic solubles; benzo(3,4)pyrene; metals content; and paraffin fractions. Specific particulate emission rates were strongly influenced by fuel type and by the presence of an organometallic smoke suppressant additive. The composition of organic solubles was primarily hydrocarbon material. (Author summary modified)

57636

APTIC NO. 82244

Hata, Toshihiko and Yoshihisa Kono

STATE OF NITROGEN IN PYROGENICALLY TREATED COKE AND NOX GENERATION IN THE SINTERING PROCESS. (*Koon shori kokusu chu no chisso no sonzai keitai to shoketsu katei ni okeru NOx no hassei*). Text in Japanese. *Tetsu To Hagane (Iron Steel)*, 61(12):69, Sept. 1975.

Coke was heat-treated at 1800 C to decompose organic nitrogen compounds, and allow the reaction of the freed atomic nitrogen with aluminum compounds in the coke to form aluminum nitride (AlN). Formation of nitrogen oxides is negligible, when coke containing AlN is used in the sintering process.

57637

APTIC NO. 84605

Hattori, Hiroshi and Toshitami Ro

INDOOR AIR POLLUTION BY TOBACCO SMOKE. II. (*Tabako kemuri ni yoru shitsunai kukiosen (2)*). Text in Japanese. *Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution)*, 10(4):607, 1975. (Presented at the Japan. Society of Air Pollution, Annual Meeting, 16th, Niigata, Nov. 5-7, 1975, Paper 341.)

A smoke chamber was used to measure the metal concentrations in the particulate matter generated during cigarette smoking. A regimen of 3-second puffs with 50-second intervals between puffs was used. The particulate matter was collected by suction on a glass filter. It was analyzed for iron, zinc, copper, cadmium, lead, manganese, and nickel, using atomic absorption spectrometry. The iron component was largest, about 3.04 mg/cigarette; the content of Zn, Cd, Pb, Mn, Ni, and Cu was 0.32, 0.42, 0.10, 0.20, 0.4, 0.04, and 0.14 mg/cigarette, respectively. A high-volume air sampler was used to sample the air in a building lounge area. The only clear results were a direct relation between the amount of Fe and Cd and the amount of smoking.

57638

APTIC NO. 84608

Hattori, Hiroshi and Toshitami Ro

INDOOR AIR POLLUTION BY TOBACCO SMOKE. I. (*Tabako kemuri ni yoru shitsunai kuki osen (1)*). Text in Japanese. *Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution)*, 10(4):606, 1975. (Presented at Japan. Society of Air Pollution, Annual Meeting, 16th, Niigata, Nov. 5-7, 1975, Paper 340.)

A closed chamber was used to study the amount of carbon monoxide and nitric oxide generated by smoking. Fifty seconds were allowed between 3-second puffs during the generation of smoke. The CO generated was measured at 5 mg/cigarette/min. The NO generated was 130 mg/cigarette/min. When the smoke was inhaled into the lungs, the CO generation was only 0.6 mg/cigarette/min. Both CO and NO were measured in a lounge area; both concentrations increased with increased numbers of smokers. A level of 3.4 g/hr of NO was measured, and it was possible from this figure to estimate the number of cigarettes smoked at 2000/hr.

57639

APTIC NO. 82183

Hayakawa, Morihiko, Akio Kamiya, Taiki Aoyama, and Hiroo Mizutani

ON THE SO₂ POLLUTION IN THE ARTERIAL ROADS. (*Kansen doro shuben ni okeru SO₂ osen ni tsuite*). Text in Japanese. *Preprint, Japan Chemical Society, Tokyo*, p. 43, 1975. (Presented at the Japan Chemical Society, Fall Meeting, 33rd, Fukuoka, Oct. 17-20, 1975.)

The SO₂ level at an intersection and along one of the main highways in Nagoya city was measured by the Para Rosaniline method. The average traffic frequency on the highway was 3600 cars/hr, of which 42% were trucks, while that at the intersection was 7400 cars/hr, of which 9% were trucks. The intersection was surrounded by large buildings, but the highway was considered to have rapid SO₂ diffusion due to its location. The SO₂ level along the highway was much higher than that at the intersection. It was around 50 ppb, and the SO₂ level decreased linearly with logarithmic distance from the highway. The SO₂ level observed at the intersection was around 20 ppb at ground level, decreasing with altitude to around 10 ppb at the height of the 10th floor of a nearby building. Tighter SO₂ emission control for diesel engines was felt to be necessary.

57640

APTIC NO. 79399

Hayashi, H.

ASBESTOS DUST. (*Asubesutosu funjin*). Text in Japanese. *Anzen Kogaku (J. Japan Soc. Safety Eng.)*, 14(4):225-233, Aug. 1975. 11 refs.

The asbestos widely used in various fields (yearly world production four million ton) has been linked with asbestos lung disease, lung cancer and mesothelioma. It has been found in lung tissues of urban inhabitants, air, soft drinks, drugs, and cosmetics, and problems of asbestos pollution are becoming serious. Mineralogical studies on asbestos (classified into chrysotile, amosite, crocidolite, anthophyllite, tremolite, and actinolite) are reviewed, with the chemical composition and crystal lattice structure. Relationships between asbestos and occupational disease and environmental pollution problems are

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57646

discussed, and the asbestos dust in working environments and allowable concentrations of asbestos determined by various regulations are discussed. Sampling and measurement methods for asbestos dust are also reviewed.

57641

APTIC NO. 84234

Heidermanns, Gies, Gustav Kuehnen, Alfred Schuetz, and Rudolf Prochazka

DUST CONCENTRATIONS IN THE MANUFACTURE OF ASBESTOS-CONTAINING FRICTION LININGS AND AT THEIR PROCESSING IN AUTOMOBILE FACTORIES. (*Staubkonzentrationen beim Herstellen asbesthaltiger Reibbeläge und deren Bearbeitung in Kfz-Werkstätten*). Text in German. Staub, Reinhaltung Luft, 35(12):433-436, 1975. 17 refs.

Extensive measurements of the concentration of asbestos dusts were carried out in friction lining plants and automobile factories. The values obtained for fine chrysotile dust in the mechanical processing of brake lining are above permissible limits. During the removal by blowing of abrasion dust from drum lining containing asbestos there were high dust concentrations, but the dust contained no chrysotile asbestos. The transformation of asbestos which obviously occurred here was confirmed by laboratory experiments.

57642

APTIC NO. 83656

Heine, C.

PRINCIPLES OF APPLIED ECOLOGY AND ELEMENTS OF DEGRADATION OF THE BIOSPHERE (CONTINUED). (*Principes d'écologie appliquée et éléments de dégradation de la biosphère (suite)*). Text in French. J. Ing., 24(1):9-17, 1975.

Air, water, and soil pollution sources, their dispersal, and their effects are reviewed. Carbon dioxide, carbon monoxide, hydrocarbons, aldehydes, sulfuric acid, nitrogen oxides, ozone, halogenated compounds, and dusts are discussed. Their dispersal is largely dependent on atmospheric movements in the troposphere and the stratosphere. Gases are frequently dissolved in water, absorbed in the ground, or transformed by plants and microorganisms. Most of the particles fall to the ground and are eventually leached back to the sea. Part of the pollutants are incorporated into the food chain and become more concentrated at each trophic level. The increasing quantities of carbon dioxide, water vapor, and aerosols are affecting the intensity of absorbed and reflected (infrared) radiation; variables are many and interactions complex. Biogeochemical cycles (carbon, nitrogen, sulfur, though not oxygen) are also being disturbed by the pollutants.

57643

APTIC NO. 84454

Heinsohn, Robert Jennings, Clotworthy Birnie, Jr., and Thomas A. Duscino

FUGITIVE DUST FROM VEHICLES USING UNPAVED ROADS. Pennsylvania State Univ., University Park, Center for Air Environment Studies, Rept. 419-75, 31p., 1975. 14 refs.

A mathematical model for predicting the concentration of fugitive dust resulting from vehicular traffic on unpaved roads is presented. The model predicts the concentration of dust downwind of a road in terms of distance, atmospheric stability, wind speed, traffic frequency, road conditions, vehicle speed, and particle size. Agreement between the model and field measurements made using a Ford Bronco traveling on a level, 1000-foot gravel road at an average speed of 30 mi/hr and passing a sampling station with a frequency of two passes/min is satisfactory in light of the imprecision of the emission factor used, the need for extrapolation of Pasquill-Gifford charts, and the limited accuracy of the predictive equation employed. Once airborne, fugitive dust plumes expand, and the gravimetric settling is lower than estimates based on the flow of aerosols in confined ducts. (Author abstract modified)

57644

APTIC NO. 83005

Hellman, T. M.

MANAGEMENT OF ODOR CONTROL PROBLEMS.

Preprint, Allied Chemical Corp., Morristown, N. J., 17p., 1975. 17 refs. (Presented at the International Pollution Engineering Congress, 4th, Cleveland, Ohio, Oct. 20-22, 1975.)

Odorants generally have not been shown to have significant physiological effects associated with exposure doses that initiate annoyance responses in the receptor public. However, as high as 60% of air pollution complaints received by certain local and state control agencies may be associated with odor exposures. The chemical industry is considered the most serious source of industrial odors, and sewage treatment is expected to become increasingly serious. While odors may not be a health problem or have hazard potential, they are taking over from visible emissions as the prime sensory indicator of air pollution. Types of odor regulations are discussed. Odor characteristics and the uncertainty associated with odor measurement are reviewed. An average observer can differentiate between three odor intensities, and a trained observer can distinguish between five and six degrees of intensity. An odor may be either acceptable or unacceptable depending upon its intensity and quality, the least acceptable compounds being mercaptans, sulfides, disulfides, amines, and aldehydes. Odor pervasiveness is the characteristic by which odors persist at detectable concentration levels over wide ranges of concentration. The dose of odorous pollutants to which the individual is exposed in the ambient air depends not only on the effluent gases, but on the distance to the source, the chemical stability of the gases, the interaction with other substances, and meteorological and topographical conditions. The generally available odor control strategies include process changes preventing the release of odorous materials; combustion techniques; water washing; reactive scrubbing, which involves the removal of odorous materials by chemical reactions adsorption; and diffusion.

57645

APTIC NO. 80284

Hicks, Ronald

ODOUR AS AN AIR POLLUTANT. The Clean Air Society of Australia and New Zealand, Clean Air Conf. 1975 Proc., Rotorua, New Zealand, 1975, p. 528-538. 18 refs. (Feb. 17-21.)

Problems associated with the measurement and control of odorous air pollutants are discussed. Many odorants are present in extremely low concentrations, making their quantitative measurement difficult. Even the best spectrometers are insufficiently sensitive to amines. Although gas chromatographs offer reproducible measurement results at very low concentrations, elaborate control procedures are required both for sample collection and analytical determination. Typical odorants include: various amines, mercaptans, sulfides, indoles, aldehydes like acrolein, and numerous organic acids. Control methods include: vapor recovery, odor masking, afterburning, adsorption, and chemical and catalytic oxidation. Typical sources of odorous emissions include: sewage treatment facilities, rendering and food processing operations, kraft pulping, and synthetic resin manufacturing.

57646

APTIC NO. 82276

Higuchi, Keizo

VARIATION OF DRIFTED SNOW THAWING PROCESS WITH AIR POLLUTION. (*Taiki osen ni tomonau sekisetsu no yukai katei no henka*). Text in Japanese. Preprint, Meteorological Society of Japan, Tokyo, p. 89, 1975. (Presented at the Osaka District Meteorological Studying Group, Autumn Lecture Meeting, Osaka, Japan, Oct. 29-31, 1975.)

In the thawing process of snow, the solid materials contained in snow are accumulated on the snow surface, forming a black cover. This phenomenon is more prominent in the polluted

urban area. The effect of solid content on the thawing process was evaluated quantitatively. The equation for the relationship between solid content in snow (n) and solid content accumulated in the surface layer (d) was derived. With an increase in d , the albedo of the snow surface is decreased, which results in an increase in absorption of radiation, thus facilitating the thawing of snow. Equations for variations in daily thawing quantity and albedo with n were derived. Calculation results of the variation of the albedo of the snow surface with the daily thawing quantity with time are given.

57647

APTIC NO. 82890

Hira, Tetsunori, Yoshihiro Izumi, and Takatoshi Tajima

INVESTIGATIONS OF ATMOSPHERIC SELF-PURIFICATION. REPORT 5. RELATIONSHIP BETWEEN AIR POLLUTION AND PRECIPITATION COMPONENTS.

(*Taiki no jijyo sayo ni kansuru chosa kenkyu* (5). *Taiki oken bussuitsu to usui seibun no kankei ni suite*). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution). (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 188.)

The amount of sulfate ion contained in precipitation was estimated using emission source data, and the amount of sulfur oxides removed from atmosphere with precipitation was estimated. From the SO_4^{--} concentration in precipitation, the amount attributable to natural phenomena (sea and ground background concentrations was subtracted, and the remainder was considered to be due to artificial emission sources. Descriptions of calculation methods are given, with results. Correlations between atmospheric SO_x concentrations and SO_4^{--} in precipitation and SO_4^{--} due to artificial sources were obtained; the correlation coefficients were 0.67 and 0.86 respectively. The contribution rates of each source to SO_4^{--} concentration in precipitation were 30.4% for artificial sources, 27.8% for sea background and 41.8% for ground background. The amount of SO_x emitted from artificial sources and removed with precipitation was estimated, based on a model of the Kanazawa area to be 346 ton/180 sq km/yr, which was about 5% of the total emission quantity of SO_x .

57648

APTIC NO. 81918

Holley, W. L.

ENVIRONMENTAL MONITORING REPORT. SANDIA LABORATORIES 1974. In: Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 1, Energy Research and Development Administration, Washington, D. C., Rept. SAND 75-0257, p. 213-227, 1975. 5 refs.

NTIS: ERDA-54

Environmental monitoring activities to determine the impact of operations of Sandia Laboratories during 1974 are reported. The concentrations of nonradioactive pollutants released by the laboratory were all below the most restrictive air quality standards. A total of 1889 kg of sulfur dioxide, 50 kg of chlorine, 1500 kg of hydrocarbon vapors, and 35 kg of chromium were released by the laboratory during 1974. Concentrations of radioactive materials in the vicinity of the laboratory were typical of natural background levels for the area. Within an 80-kilometer radius of Albuquerque, the maximum population dose commitment due to releases from Sandia Laboratories was less than 1 man-rem for 1974 as compared to 57,000 man-rem due to natural background radiation.

57649

APTIC NO. 76545

Hopkins, D. W., W. Johnson, and R. Davies

CONSTITUTION OF OXIDE FUME FROM STEELMAKING. *Ironmaking Steelmaking*, 2(1):25-29, 1975. 14 refs.

Samples of fumes produced by seven different oxygen steel-making processes were examined by optical, electron optical, and X-ray diffraction techniques. The fumes are extremely complex in composition and constitution, but there are many common structural features. The presence of substantial

amounts of iron oxide (Fe_2O_3), particularly with the epsilon crystal structure in the size range 0.03-1 micron, supports the vaporization-oxidation-condensation hypothesis for the mode of formation of fume. Other constituents, notably the slag-metal-oxide spheres and particles, indicate the complexity of the reactions occurring in the refining process, and in the subsequent flight in the gas stream. The impurities can be used to identify the input materials and sometimes the steelmaking practice. (Author conclusions modified)

57650

APTIC NO. 83634

Horvath, Laszlo and Kalman Stocker

SIGNIFICANCE AND TASKS OF ENVIRONMENTAL PROTECTION IN FOUNDRIES. (*Az ontodei környezet-vedelem jelentosege es feladata*). Text in Hungarian. Banyasz. Kohasz. Lapok - Ontode, 26(9):206-210, Sept. 1975.

Sources of environmental hazards in the foundry industry are inventorized, and efforts to be made in environmental protection in the Hungarian foundry industry are outlined. The measures taken so far are more or less limited to the improvement of working conditions. The introduction of environmentally favorable technologies and emission control devices will require systematic emission measurements. Cupola ovens and electric-arc furnaces are the chief sources of dust emissions along with the sand used for molding. Induction furnaces are most acceptable environmentally. Harmful and malodorous gases, containing carbon monoxide, carbon dioxide, hydrogen, hydrogen sulfide, phenol, formaldehyde, and other hydrocarbons are generated during casting in sand forms. The use of natural gas as a secondary fuel, hot air blow, secondary air to reduce the coke consumption in cupolas, the replacement of cupolas by induction furnaces, the installation of efficient dust separators (cyclone-wet type separator combinations, venturi scrubbers, disintegrators, wet or dry electrostatic precipitators or tissue filters), casting in chill, and vacuum forming are considered the most efficient methods of abating emissions in foundries.

57651

APTIC NO. 82172

Hoshika, Yasuyuki, Ichiro Kozima, Kazumi Koike, and Kenji Yoshimoto

ANALYSIS OF THE SULFUR COMPOUNDS IN THE EXHAUST GASES FROM TWO CORN STARCH FACTORIES. Text in Japanese. Yukagaku (J. Japan Oil Chem. Soc.), 24(5):317-318, 1975. 18 refs.

Samples for gas chromatographic analyses of representative lower sulfur compounds in the exhaust gases from two corn starch factories, one unautomated and one automated, were prepared by direct cold trap with liquid oxygen and analyzed by flame photometric detector. The detected concentration ranges and average values of the compounds in the exhaust gas from the unautomated factory were: carbonyl sulfide, 0.02 and 0.03 ppm (average 0.025 ppm); hydrogen sulfide, 0.5 to 2.1 ppm (average 1.3 ppm); carbon disulfide, 0.01 ppm; methyl mercaptan, 0.3 to 0.6 ppm (average 0.45 ppm); sulfur dioxide, 0.1 to 0.3 ppm (average 0.2 ppm); and dimethyl sulfide, 0.05 to 0.1 ppm (average 0.075 ppm). The exhaust gas from the automated factory contained 0.02 ppm carbonyl sulfide, 0.02 ppm hydrogen sulfide, 0.004 ppm carbon disulfide, 0.01 ppm methyl mercaptan, and 680 ppm sulfur dioxide. (Author abstract)

57652

APTIC NO. 83637

Huber, G. L.

IMPROVEMENT OF THE ENVIRONMENTAL SITUATION IN THE CANTON VALAIS AND ITS SPECIFIC PROBLEMS. (*Etat de l'assainissement dans le canton du Valais et ses problemes specifiques*). Text in French. Gas Wasser Abwasser, 55(11):725-727, 1975.

While the canton Valais has made significant progress over the past 10 years to control water pollution and treat waste water, tolerable emission concentrations have not been achieved for

the most part. Fluorine remains the major air pollutant since the area encompasses all Swiss aluminum industry installations. These are equipped with scrubbers to treat waste gases from electrolytic processes. Although such measures are efficient, emission concentrations are still too high. In the Martigny region, a mathematical model has been established to determine concentration rates of pollutants emitted from specific sources. Chimney heights of a number of incinerator and refining installations have been adjusted on the basis of similar procedures. Natural phenomena such as irregular wind patterns and air currents from lateral valleys must also be contended with.

57653

APTIC NO. 81876

Ingalls, M. N. and K. J. Springer

MASS EMISSIONS FROM TEN PRE-CONTROLLED GASOLINE TRUCKS, AND COMPARISONS BETWEEN DIFFERENT TRUCKS ON A ROAD COURSE (FINAL REPORT). Southwest Research Inst., San Antonio, Tex., Office of Air and Waste Management Contract 68-03-0441, Rept. EPA-460/3-75-004, 400p., April 1975. 8 refs.

NTIS: PB 251586/AS

Mass rates of hydrocarbons, carbon monoxide, and nitrogen oxides from a group of 10 precontrolled gasoline-powered trucks (model years 1965-1969) were obtained during chassis dynamometer studies (Federal Test) and road tests. The average nine-mode hydrocarbon, CO, and NOx levels were 70, 89, and 144%, respectively, of the road levels recorded. These results were compared with mass emissions from a group of 25 post-1970 (emission controlled) trucks and 10 diesel trucks which were evaluated in previous studies. The average mass hydrocarbon and CO road emissions from the controlled gasoline powered trucks were lower than those from precontrolled trucks, while the NOx road emissions were higher than those for precontrolled trucks. Average road hydrocarbon, CO, and NOx emissions (g/ton-mi) for diesel trucks were lower than those from controlled gasoline powered trucks. (Author summary modified)

57654

APTIC NO. 82944

Itai, Kazuyoshi

ATMOSPHERIC CONCENTRATION OF FLUORIDE COMPOUNDS IN VARIOUS PLACES. (*Honpo kakuchi no taikichu fukkabutsu nodo ni tsuite*). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):233, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975.)

Atmospheric fluoride was analyzed at an active volcano and at various industries such as aluminum refining, ceramics, iron-steel manufacture, and phosphatic fertilizer manufacture. The air sample was collected both by Millipore AA filter and a filter paper with 1% sodium carbonate solution in order to have differentiated collection of fluoride particulates and gaseous fluorides. Of the residential areas without a specific fluoride pollution source, 84% showed less than 0.1 microgram F/cu m air. The fluoride level near the volcano was 1 microgram F/cu m, of which 72.2% was gaseous fluoride. Of the fluorides at areas with ceramics industries, 70% were gaseous, while 10% of the fluorides at an area with aluminum refining were gaseous.

57655

APTIC NO. 84609

Iwasaki, Yoshiaki, Yu Fukushima, Harukichi Onozuka, Tatsukichi Ishiguro, and Toshio Ohira

CONTINUOUS RESEARCH OF HCL FROM INCINERATOR. (*Seisokujo ni okeru HCl no renzokuteki haishutsu jokyō no koaku*). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):536, 1975. (Presented at Japan Society of Air Pollution, Annual Meeting, 16th, Niigata, Nov. 5-7, 1975, Paper 272.)

The hydrochloric acid emissions from three incinerators in Tokyo, Japan, were continuously monitored by an electroconductivity method utilizing a sodium chloride-hydrogen peroxide absorbing liquid. One incinerator, which normally disposes of 300 ton/day, was not equipped with an HCl removal facility, and its HCl emissions ranged from 750 to 310 ppm with an average of 560 ppm. The other two incinerators were equipped with water cooling facilities to lower the temperature of the flue gas, which also reduced HCl emissions. One of these two incinerators emitted HCl concentrations ranging from 80 to 310 ppm with an average of 200 ppm, while the other emitted from 250 to 430 ppm HCl with an average of 310 ppm. The correlation of HCl emission with sulfur dioxide, nitrogen oxide, and oxygen concentrations in the flue gas was examined; however, no correlations were observed. A correlation of HCl emission with the flue gas temperature was found to exist.

57656

APTIC NO. 79698

Jablonski, Kiril W. and Stanislaw Mierzwiński

THE SPREAD OF GAS POLLUTANTS IN HOT INDUSTRIAL AREAS. (*Rozprzestrzenianie się zanieczyszczonych gazowych w gorących halach*). Text in Polish. Ochrona Powietrza (Warsaw), no. 3:86-91, 1975. 11 refs.

In calculations of air exchange with the objective of eliminating harmful gases, it is necessary to take into consideration the conditions of their spread in industrial spaces. These conditions consist particularly of: (1) the location and strength of heat and gas sources, (2) air movements (convection) and (3) their stratification. If sources of gas and heat pollution coincide, the distribution of the air pollution concentrations in industrial workshops is similar to that of the temperature and can be determined by it. However, if both sources of pollution have different locations, distribution of concentrations and heat can considerably deviate from one another. Detailed and substantiated data on ventilation planning can be obtained by means of physical models.

57657

APTIC NO. 84366

Jaffe, Louis S.

THE GLOBAL BALANCE OF CARBON MONOXIDE. In: *The Changing Global Environment*. S. Fred Singer (ed.), Boston, Mass., D. Reidel Publishing Co., 1975, p. 83-110. 139 refs.

The global balance of carbon monoxide is reviewed in terms of natural and anthropogenic sources. The total annual tonnages of CO from manmade sources exceeded 132 million metric tons in the United States and 359 million metric tons globally in 1970. The motor vehicle was the largest single source of CO, accounting for about 66% of the anthropogenic CO emissions in the United States and about 55% of the anthropogenic CO emissions globally during 1970. Airborne CO concentrations range from about 1 to more than 70 ppm, with brief peak levels as high as 140 ppm occurring. Although localized CO buildup in cities may represent a serious health hazard, man's CO production is relatively insignificant on a global basis. Natural sources such as the ocean, plant chlorophyll decay, atmospheric methane oxidation, and plant terpene oxidation account for 3-14 times the CO produced by man. Background concentrations, a product of both natural and anthropogenic sources, normally range from 0.04-0.20 ppm. (Author abstract modified)

57658

APTIC NO. 81933

Jentoft, R. E. and T. H. Gouw

ANALYSIS OF POLYNUCLEAR AROMATIC HYDROCARBONS FROM AUTOMOBILE EXHAUST BY SUPERCRITICAL FLUID CHROMATOGRAPHY. *Am. Chem. Soc. Petrol. Chem. Preprints*, 20(4):797-811, Sept. 1975. 20 refs. (Presented at the American Chemical Society, Division of Petroleum Chemistry, Inc., Symposium on Chemistry, Occurrence, and Measurement of Polynuclear Aromatic Hydrocarbons, Chicago, Ill., Aug. 25-29, 1975.)

The analysis of polynuclear aromatic hydrocarbons from automobile exhaust by supercritical fluid chromatography is described. The supercritical fluid used as the mobile phase is carbon dioxide. The system consists of a high pressure pump, a pressure programmer, a chromatograph oven, and a high pressure variable wavelength ultraviolet absorption detection system. Packing materials which can be used for separation of polynuclear aromatic compounds with supercritical carbon dioxide as the mobile phase include: Du Pont Permaphase ETH and ODS and VYDAC Reverse Phase. The column is prepared from stainless steel tubing with an internal diameter of 0.21 cm and a length of 3.5 m. The mobile phase is liquid as it exits from the outlet of the column and drops into test tubes mounted in a fraction collector. The solvent (CO₂) is removed by reducing the pressure in the fraction collector on the outlet backpressure regulator. A major advantage of supercritical fluid chromatography is its high degree of selectivity. The mobile phase can compete actively for the solute molecules, resulting in an additional degree of freedom in the adjustment of the selectivity. The selectivity behavior can also be influenced by adjusting the pressure of the system.

57659

APTIC NO. 76284

Johnson, Carl J., John Moran, and Robert Pekich

CARBON MONOXIDE IN SCHOOL BUSES. *Am. J. Public Health*, 65(12):1327-1329, Dec. 1975. 8 refs. (Presented at the American Public Health Association, Annual Meeting, 102nd, New Orleans, La., Oct. 23, 1974.)

Carbon monoxide levels in school buses in the Seattle area were measured following an incident in which eight children became ill from CO in a school bus. A total of 33 buses were checked immediately upon arrival to determine in-transit levels of CO. Four of the 33 buses have CO levels in excess of Environmental Protection Agency maximum allowable concentrations for an 8-hour exposure. Two of 65 buses which sat idling in a parking lot have nearly three times the concentration of CO permitted by the EPA for a 1-hour exposure. A total of seven buses has concentrations of CO not permitted by the EPA for more than a 1-hour period. There are 24 buses with levels of CO in excess of EPA standards for an 8-hour exposure. (Author summary modified)

57660

APTIC NO. 76492

Johnson, Carl J., John C. Moran, Steve C. Paine, Herbert C. Anderson, and Peter A. Breysse

ABATEMENT OF TOXIC LEVELS OF CARBON MONOXIDE IN SEATTLE ICE-SKATING RINKS. *Am. J. Public Health*, 65(10):1087-1090, Oct. 1975. 3 refs. (Presented at the American Public Health Association, Annual Meeting, 101st, San Francisco, Calif., Nov. 1973.)

The control of toxic levels of carbon monoxide in Seattle ice skating rinks is discussed. Carbon monoxide levels as high as 304 ppm are found in ice skating areas where ice resurfacing machines powered by propane fuel engines are used. Nitrogen oxides are also a problem associated with propane and gasoline powered engines used in ice skating arenas. Pollution levels are decreased by increasing ventilation in the arenas and operating the machine less often and for shorter periods. Catalytic mufflers are effective for engines that are properly tuned and are operated on propane or lead free gasoline. The best solution is the use of an electrically powered ice-resurfacing machine.

57661

APTIC NO. 76448

Jones, M. T. and N. G. Thom

AN INVESTIGATION INTO CARBON MONOXIDE EMISSIONS FROM MOTOR VEHICLES IN NEW ZEALAND. *The Clean Air Society of Australia and New Zealand, Clean Air Conf. 1975 Proc., Rotorua, New Zealand, 1975, p. 281-297. 16 refs. (Feb. 17-21.)*

Carbon monoxide emission levels from motor vehicles in Auckland and Christchurch, New Zealand are reported along

with studies of appropriate driving cycles for establishing emission standards. About 2.2% of the cars tested in Auckland during 1972 showed CO emissions above the upper limit of 12%, while 22.2% of the cars in Christchurch showed emissions greater than the 12% figure. Tests of various alternative driving cycles revealed that a driving cycle representative of the long idle time found in New Zealand cities is required for the establishment of emission standards. A CO standard of 4.5% at idle is considered to be appropriate for general application throughout the country.

57662

APTIC NO. 76357

Jordy, Angelika

EMISSION MEASUREMENTS AFTER STERILIZATION WITH ETOX. *Bull. Environ. Contamination Toxicol.*, 14(4):432-440, Oct. 1975.

The concentration of ethylene oxide was determined according to the heat tone principle at the emission opening during evacuation of a sterilization chamber. By using a high blow-off speed and a long exhaust pipe, the ethylene oxide emitted is very rapidly reduced to such an extent that even at the beginning of aeration concentrations of more than 5 g/cu m are no longer detected at a distance of 20 cm from the rain cap. The emission of ethylene oxide depends more on the gas concentration/cu m than the ratio of the total amount of gas to the chamber capacity. (Author conclusions modified)

57663

APTIC NO. 76478

Joshi, Satish and Hans-Urs Wanner

EMISSIONS FROM COMBUSTION OF INDOOR DUST. (*Emissionen bei der Versengung von Raumluftstaub*). Text in German. *Zentralbl. Bakteriol. Hyg., Infektionskr. Abt. Orig. B.*, 160:499-508, 1975. 6 refs.

Physico-chemical changes caused by heating indoor dust in a model apparatus were investigated. When heated, the dust samples emitted carbon monoxide, carbon dioxide, oxides of nitrogen, and ammonia. The higher the temperature, the higher the weight loss expressed as a percentage. The residence time had no effect on the loss. Three dust samples showed a pH of 7 before being heated, while the fourth showed pH of 10. After heating to 200 C, the pH of one of the samples rose from 7 to 10. When heated to 400 and 600 C, all the samples showed pH values between 10 and 11. The residence time had no effect. The pH of the gaseous reaction products did not show a uniform pattern at 200 C. At 400 C the measured pH was between 7.5 and 8.5, while at 600 C no further change was observed.

57664

APTIC NO. 82713

Kaakinen, John W., Roger M. Jorden, Mohammed H. Lawasani, and Ronald E. West

TRACE ELEMENT BEHAVIOR IN A COAL-FIRED POWER PLANT. *Preprint, American Chemical Society, Washington, D. C., Div. of Environmental Chemistry, 29p., 1975. 32 refs. (Presented at the American Chemical Society National Meeting, 169th, Philadelphia, Pa., April 1975.)*

Measurements of the amounts of 17 elements in the inlets and outlets of a pulverized coal-fired power plant were performed. Aluminum, iron, rubidium, strontium, yttrium, and niobium were at essentially constant concentrations in all outlet ashes. Concentrations of copper, zinc, arsenic, molybdenum, antimony, lead, polonium-210, and selenium were generally lowest in bottom ash and increased progressively in fly ash collected downstream toward the stack. A model was developed for the enrichment behavior of this latter group of elements in downstream ash assuming the following: these elements vaporize in the furnace and then condense or absorb onto fly ash; smaller particles possess larger specific surface areas and thus possess greater concentrations of these elements; and an increasing proportion of smaller particles in downstream fly ash results in enrichment of these elements.

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57670

Experimental enrichment values for Zn, As, Mo, and Sb agreed with values predicted by this model. (Author abstract modified)

57665

APTIC NO. 81916

Kalmon, B.

PORTSMOUTH GASEOUS DIFFUSION PLANT ENVIRONMENTAL MONITORING REPORT - 1974. In: *Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 2, Energy Research and Development Administration, Washington, D. C., Rept. GAT-824, p. 1035-1064, 1975, 3 refs.*

NTIS: ERDA-54

Environmental monitoring data for the Portsmouth Gaseous Diffusion Plant are presented. The principal process in the plant is the separation of uranium isotopes through gaseous diffusion. The highest single ambient sulfur dioxide concentration measured in the plant's vicinity was 12% of the most recent federal standard, and the average values were less than 3% of the standard. The highest fluoride concentration measured near the plant was 2.65 micrograms/cu m. Sulfur dioxide emissions during the burning of low sulfur coal were slightly less than 1 lb/million Btu, and SO₂ emissions during the burning of high sulfur coal amounted to slightly over 3 lb/million Btu. Particulate matter emissions amounted to 0.4 and 0.2 lb/million Btu for low and high sulfur coal, respectively.

57666

APTIC NO. 76606

Kassebart, Volker, Wolfgang Knorr, and Wolfhard Schinze

HEALTH HAZARDS THROUGH CARBON MONOXIDE AT WORKING PLACES IN TUNNELS. (*Zur Gesundheitsgefahr durch Kohlenmonoxid an Arbeitsplätzen im Tunnelbau*). Text in German. Staub, Reinhaltung Luft, 35(11):403-405, 1975, 7 refs.

Eleven tunnel construction sites in West Germany were inspected to determine whether workers were exposed to potentially harmful emissions from vehicles with gas-oil motors. Air samples were analyzed for carbon monoxide by gas chromatography. Blood samples were taken from 200 miners. Under typical working conditions, there was no health hazard due to CO.

57667

APTIC NO. 76638

Kautz, K., H. Kirsch, and D. W. Laufhütte

TRACE ELEMENT CONTENT IN SOFT COALS AND IN THEIR DUSTS. (*Ueber Spurenelementgehalte in Steinkohlen und den daraus entstehenden Reingasstauben*). Text in German. VGB Kraftwerkstechnik, 55(10):672-676, Oct. 1975.

Twenty-six different coals and dust samples emitted during their combustion were analyzed for 26 elements. The silver, beryllium, bismuth, cadmium, mercury, iodine, tin, selenium, tellurium, tantalum, and tungsten contents in anhydrous coal were below 10 ppm, while the contents of another 7 elements (arsenic, boron, cobalt, chromium, copper, molybdenum, and nickel) were below 100 ppm, averaging below 50 ppm. The barium, fluorine, phosphorus, lead, strontium, vanadium, and zinc contents were between 50 ppm and 400 ppm. The silver, beryllium, bismuth, cadmium, mercury, iodine, thallium, tantalum, uranium, and tungsten contents in the emitted dust were below 50 ppm, and the arsenic, boron, cobalt, copper, molybdenum, tin, and selenium contents averaged between 100 and 500 ppm. The barium, chromium, fluorine, nickel, phosphorus, lead, strontium, vanadium, and zinc contents were between 500 and 3000 ppm. Phosphorus contents of up to 14,000 ppm were measured.

57668

APTIC NO. 79654

Khassanov, V. K.

COTTON-CLEANING PLANTS AS SOURCES OF AIR POLLUTION. (*Khlopkoochistitel'nyye zavody kak istochniki zagryazneniya atmosfery vozdukhom*). Text in Russian. Gigena i Sanit., no. 5:96-97, 1975.

General problems of air pollutant emissions generated by cotton-cleaning plants are described, and the results of actual dust concentration measurements in an around a cotton-cleaning plant are described. The particulate emissions are highly dispersed; they contain 16-32% of silica, and 39-57% of silicates. Bacteria, molds, and organochloride pesticides are also present in the emissions. Dust concentrations between 114.5 and 380.7 mg/cu m were measured inside a cotton-cleaning shop. The dust concentrations were between 15.1 and 48.2 mg/cu m at 300 m distances; between 3.6 and 29.8 mg/cu m at 500 m distance, and between 3.2 and 12.5 mg/cu m at 1000 m distance from the cotton-cleaning plant, against a MAC value of 0.5 mg/cu m. The emissions were due to the low efficiency of the dust settling chambers and cyclones used in the plant. Falling dust interfered considerably with fruit-growing within a 300 to 1000 m radius. A sanitary protection zone of 300 m is recommended around cotton-cleaning plants.

57669

APTIC NO. 84617

Kikuchi, Tadashi, Jun Yagi, Miyo Kaneko, and Tokio Goto

CONCENTRATION OF ATMOSPHERIC HYDROCARBONS AROUND THE PETROLEUM TANKS. (*Sekiyu kichi yoru hassei suru tankaiso ni tsuite*). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):583, 1975. (Presented at the Japan. Society of Air Pollution, Annual Meeting, 16th, Niigata, Nov. 5-7, 1975, Paper 314.)

Hydrocarbon levels in the atmosphere around a petroleum installation in Miyagi Prefecture were measured to assess the effects of loss from storage tanks and from the filling of tank trucks. The average 1-hour level for total hydrocarbons around the installation was 10 ppm, determined by gas chromatography. This value was similar around the tank trucks, but the concentration of low boiling point hydrocarbons (C₂ to C₅) was greater around the trucks than at other parts of the installation.

57670

APTIC NO. 79610

Kimura, Kazuo, Hironari Kaji, Nobuhiko Nakano, and Tadashi Ito

MEASUREMENT OF TRACE HYDROCARBONS IN AUTOMOBILE EXHAUST. (*Jidosha haigasochu no biryo tankaiso no sokutei*). Text in Japanese. Preprint, Society of Automotive Engineers of Japan, Tokyo, p. 609-614, 1975, 4 refs. (Presented at the Society of Automotive Engineers of Japan, Inc., Lecture Meeting, Kyoto, Oct. 29-30, 1975.)

Automotive exhaust gas was sampled at 2.0 l/min for 10-80 l using a diaphragm pump; the phenol derivatives and aromatic aldehydes were collected by a water trap cooled at 0 deg and by a series of two columns packed with 20-30 mesh silica gel. Preliminary experiments revealed that 100% of the aldehydes in the columns were recovered by eluting them with 60 ml methanol. The compounds in the water trap were extracted with dichloromethane and the extract was concentrated under vacuum. The column eluent and the concentrated extract were analyzed by gas chromatography-mass spectrometry. The GC column (3 mm times 2 m) was packed with 1% OV on Chromosorb W (60/80 mesh) and helium at 30 ml/min was used as the carrier gas. Results showed that the concentrated dichloromethane-extract contained benzaldehyde, phenol, benzyl alcohol, o-, m-, and p-tolualdehydes, cresol, dimethylphenol, methylbenzylalcohol, ethylphenol, dimethylbenzaldehyde, dimethylbenzylalcohol, trimethylphenol, and propylphenol. The silica gel column eluent contained toluene, ethylbenzene, dimethylbenzene, benzaldehyde, propylbenzene,

isopropylbenzene, o-, m-, and p-tolaldehyde, naphthalene and methylnaphthalene.

57671

APTIC NO. 76459

King, William R. and James K. Ferrell

WET PROCESS ACID PLANT WASTEWATER PONDS, AN ATMOSPHERIC FLUORIDE POLLUTION PROBLEM? Preprint, FMC Corp., Philadelphia, Pa., and North State Univ., Raleigh, N. C., 18p., July 1975. 7 refs.

A method for estimating the volatile fluorine emissions from phosphoric acid plant waste water ponds was developed and verified by actual downwind measurements. Fluorine emission rates for two actual ponds were estimated from a knowledge of the fluorine concentration and water temperature of the ponds and atmospheric conditions at the ponds. These emission estimates were then entered into a standard atmospheric dispersion model which predicted ambient air fluorine concentrations downwind of the two ponds. None of the estimates were significantly different from the measured values at the 95% confidence level.

57672

APTIC NO. 83865

Kobayashi, Hideo and Yoshikazu Hashimoto

SIZE DISTRIBUTION OF HIGHWAY AEROSOL.

(Kosoku doro carozoru no rudo bunpu). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):368, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 114.)

The size distribution of suspended dust was studied by collecting samples near a highway using an 8-stage Andersen sampler. The collected dust sample was weighed and decomposed by hydrochloric acid-hydrogen peroxide for the determination of iron, zinc, manganese, lead, and copper by atomic absorption spectrometry. The particle size distribution curve was V-shaped. Particles 2 micron in size were least represented in the collected dust, and no peak particle size was observed. This was quite different from the size distribution curve generally observed in city areas, showing two peaks at 3 micron and 0.5 micron. The concentration of iron, manganese, and zinc particles increased in the size range greater than 3 micron, while the lead concentration increased in the size range smaller than 0.5 micron.

57673

APTIC NO. 81744

Kobayashi, K., Y. Isowa, and T. Miyamoto

SOOT AND DUST INVESTIGATION IN EMISSION GAS FROM PLANTS. (Kojo hai gasu chu no baijin chosa).

Text in Japanese. Ibaragi-ken Kogaigijutsu Senta Nenpo (Annu. Rept. Environ. Pollut. Res. Center Ibaragi Pref.), no. 7:78-79, Oct. 1975.

The results of a survey of the soot and dust concentrations in flue gas from 31 chimneys of 15 facilities in 1974 are reported. There was only one facility which exceeded its emission standard. This was the flue gas from the dryer at an asphalt manufacturer, and its soot and dust concentration was 1.9 g/N cu m, while the standard was 0.80 g/N cu m. All of the other chimneys, including those of power plants, paper mills, chemical plants, oil refineries, metal smelting plants, and food manufacturers emitted soot and dust concentrations well below the standards (ranging up to 0.27 g/N cu m).

57674

APTIC NO. 76549

Kobayashi, Sadami

ON EXHAUST MATERIALS FROM GASOLINE-POWERED AUTOMOBILES. (Gasolin jidosha haishutsu-butsu ni tsuite). Text in Japanese. Idemitsu Sekiyu Gijutsu (Idemitsu Pet. J.), 18(5):487-521, 1975. 99 refs.

Exhaust materials from gasoline-powered automobiles (gaseous products; polynuclear aromatic hydrocarbons; particulate matter) are discussed with emphasis on methods of de-

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tection, and effects of fuel composition on these emissions. Currently, in Japan, 10-mode (hot start) and 11-mode (cold start) testing methods for simulated driving patterns are used to measure emissions of hydrocarbons, carbon monoxide, and nitrogen oxides. For used cars, the 4-mode (hot start) testing method is used to measure effectiveness of catalyst activity. Experiments with ethylbenzene show that use of collection bags for exhaust, made of Tedlar (polyvinyl fluoride), results in least adsorption on bag surfaces. An increase in absolute atmospheric humidity (from 30 to 120 grains/lb) decreases emissions of nitrogen oxides (from 3000 to 2000 ppm, cold start; 5100 to 3600 ppm, 50 mi/hr). When aromatic hydrocarbons are added to fuel, total exhaust hydrocarbon concentrations, expressed in terms of mole ppm, decrease. The addition can increase formation of benzo(a)pyrene. An increase of olefins in fuel does not affect the type of hydrocarbon emitted. About 30 kinds of polynuclear aromatic hydrocarbons have been isolated from automobile exhausts, of which about 10 have been classified as carcinogenic. Benzo(a)pyrene and dibenz(a,h)anthracene, show most biological activity, followed by benzo(j)fluorescein and benzo(b)fluorescein. With unleaded gasoline, the amount of emitted benzo(a)pyrene increased from about 40 (hot start) to 1500 (cold start) micrograms/gal. Automobile particulate emissions range in size from sub-microns to 3000 microns. Proposed 1975 United States standards set 0.1 g/mile as a total particulate emission standard. Amount of particulate emissions from using leaded gasoline increased from 0.3 (no choke starts) to 0.4 (choke used every start) g/mile. For unleaded gasoline, amounts ranged from 0.04 to 0.45 g/mile. Particulates under 0.1 microns in size comprise 40% of total particulate emissions when leaded fuel is used; for unleaded fuel, 10%.

57675

APTIC NO. 82946

Kobayashi, Yoshiki and Tadashi Ikezawa

PHYSICO-CHEMICAL PROPERTIES OF PARTICULATE MATTERS FROM OIL-FIRED AND COAL-FIRED BOILERS. (Boira kara haishutsu sareru ryushijyo busshitsu no sutsuri kagakuteki tokusei). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):278, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 15.)

An analysis of the chemical composition of the particulate matter emitted from boilers by atomic absorption spectrometry and X-ray diffraction is given. Sulfate ion in particulate matter was also analyzed. The boilers studied were heavy oil burning boilers with and without ammonia injection, and coal burning boilers. The metals analyzed were vanadium, nickel, iron, manganese, zinc, lead, cadmium, copper, chromium, and cobalt. The V and Ni contents in the particulate matter emitted from the heavy oil boilers were much higher than from the coal boiler (565 microgram/g V and 16 microgram/g Ni for coal boilers). The V and Ni contents were higher for boilers without ammonia injection than with it; the V content for the former ranged from 7180 to 38,700 microgram/g, while for the latter it ranged from 3880 to 4340 microgram/g. The latter boilers had much higher iron levels than the former ranging from 16,000 to 19,200 microgram/g, compared to a range of 1440 to 6990 microgram/g for boilers without ammonia injection. The chemical form of the particulate matter from heavy-oil boilers was unburned carbon, sulfuric acid, metal salts, and trace metal oxides; that from coal burning boilers included silica and its metal salts. The acidity of the particulate matter for the coal boiler was less than 1/3 of the acidity for the heavy oil boilers. Between 60 and 70% of the sulfate ion concentration observed in the particulate matter was attributed to sulfuric acid for the heavy oil boilers; the sulfate ion concentration ranged from 291 to 477 microgram/g.

57676

APTIC NO. 76069

Koch, R. C.

SUMMARY REPORT ON MODELING ANALYSIS OF SELECTED POWER PLANTS IN 128 AQCRS FOR EVALUATION OF IMPACT ON AMBIENT SO₂ CON-

EMISSION SOURCES

57681

CENTRATIONS, VOLUME II (FINAL REPORT).
GEOMET, Inc., Gaithersburg, Md., Office of Air and
Waste Management Contract 68-02-1483, Program Element
2AC129, Rept. EPA-430/3-75-063, EF-486, 68p., June 1975.
12 refs.

NTIS: PB 246082/AS

The results from dispersion modeling analyses of 206 power plants in 68 Air Quality Control Regions are presented as part of an effort to evaluate the impact of power plant operations on ambient sulfur dioxide concentrations. Among these 206 power plants modeled for 1972 operations, SO₂ emissions from approximately 34 plants resulted in concentrations which, by themselves, exceeded the primary 24-hour standard. Emissions from none of the plants for which an annual SO₂ prediction was obtained exceeded the primary annual SO₂ standard. (Author abstract modified)

57677

APTIC NO. 79641

Koehle, Herbert

PROBLEMS WITH THE COMBUSTION OF SOME FUELS IN POWER PLANTS. (Probleme bei der Verfeuerung einiger Brennstoffe in Kraftwerken). Text in German. *Energie* (Munich), 27(3):75-79, 1975. 33 refs.

Air pollution problems occurring during the combustion of some fuels in power plants are discussed. Combustion of sulfurous fuels at high excess air coefficients results in the oxidation of sulfur dioxide to sulfur trioxide, especially in the presence of catalysts, such as vanadium pentoxide, nickel oxides, and iron oxides. The sulfuric acid formed of SO₂ lowers the dew point of the flue gases, and causes corrosion. The problem of SO₃ can be solved or alleviated by using a low excess air coefficient, and by the addition of basic compounds for the adsorption of SO₃, such as magnesia, dolomite, lime, or alkaline organic substances. The ashes generated during combustion can bind about 10% of the SO₂ in the case of soft coal, about 30% in the case of brown coal, while practically no SO₂ adsorption takes place in the case of fuel oil. Nitrogen oxides generated during the combustion process is one of the causes of smog formation. The fly-ash emission is limited to 150 mg/N cu m for power plants. Modern dust separators, such as electrostatic precipitators, make it possible to reach residual dust concentrations of 80-100 mg/N cu m. Despite a doubling of the amount of electricity generated, power plants emit now only 10-20% of the fly ash that had been emitted 10 years ago.

57678

APTIC NO. 83502

Kohayagawa, Takashi

AUTOMOBILE EMISSION COMPOSITION AND IMPROVEMENT OF ENGINE. HYDROCARBON CONTROL IN PARTICULAR. (Jidosha haishutusu gasu sousei to engin taisaku gijitsu. Tokuni HC kisei ni kanrenshite). Text in Japanese. *Sangyo Kogai* (Ind. Public Nuisance), 11(12):1112-1119, Dec. 1975. 6 refs.

The 1975 Japanese standard for auto exhaust emission gas is one of the strictest standards in the world, especially the regulations for hydrocarbons (HC) and carbon monoxide (CO), which are so severe that they only allow a total emission only 1/10 of the amount allowed by the 1973 standard. The composition of auto exhaust emission gas and the remodeling of engines are discussed in relation to the HC emission regulations, and the following subjects are investigated: exhaust emission gas purification technology and remodeling of the engines; the significance of HC regulations (analysis of photochemical reactions, the HC contribution to photochemical reactions, and the prevention of photochemical smog); problems related to the prevention of photochemical smog; various purification methods and the composition of exhaust gas; evaluation of purification methods from the view point of photochemical reactivity; and a proposal for HC regulations. The investigation concludes that auto exhaust emission gas is overestimated as a source of air pollution and that HC regulations must not be set unless the factors of pollution are completely understood.

57679

APTIC NO. 80224

Kolb, J. O.

EFFECTS ON AIR QUALITY FROM MIUS AND CONVENTIONAL THERMAL-ELECTRIC SYSTEMS. Oak Ridge National Lab., Oak Ridge, Tenn., Intersoc. Energy Conversion and Eng. Conf. Proc., 10th, 1975, p. 269-277. 7 refs. (Aug. 18-22.)

The effects on local air quality from emissions of the thermal-electric subsystem of a Modular Integrated Utility System (MIUS) and conventional utilities were evaluated. The subsystem provides space heating, cooling, hot water, and electricity. The comparison is based on 60 garden apartment buildings with 720 apartments housing about 2500 people. Electrical generation in the MIUS was natural gas fueled spark ignition engines or diesel engines; electrical generation by conventional utilities was by 52% new coal fired and 48% light-water nuclear plants. Four conventional building equipment models were considered. Philadelphia, Minneapolis, Miami, Dallas, and San Diego climates were considered. The apartments were located within 10 to 20 miles of a coal fired generating plant, where the annual average pollutant concentration was the highest. Oil fueled MIUS emissions without an incinerator was higher for nitrogen oxides, sulfur dioxide, and carbon monoxide than those of conventional utilities, but lower for particulates. A natural gas fueled MIUS has much less SO₂ than conventional models. Incineration of solid wastes from the residential consumers served by the MIUS substantially increases hydrocarbon, particulate, and CO emissions. The impact of MIUS emissions on air quality is highly localized; maximum concentrations occur within 20 m from a 30 m stack and concentrations drop by an order of magnitude within 400 to 600 m. Maximum MIUS pollutant concentrations exceed pollutant concentrations from conventional utilities except those with individual building boilers. Maximum annual average concentrations varied by a factor of two or less for MIUS in different climates. (Author abstract modified)

57680

APTIC NO. 81639

Komiyama, Kunihiko

STUDY ON THE COMBUSTION AND AIR-FUEL MIXING PROCESSES IN THE DIESEL ENGINE. (Dizzeru engin no nensho to kongoki keisei katei no kenkyu). Text in Japanese. *Komatsu Gihō* (Komatsu Tech. Repts.), 21(70-2):14-24, 1975. 12 refs.

The accurate evaluation of engine performance data and parametric evaluation of the effect of various design parameters on engine performances can be made using a diesel engine combustion model (computer software) for the development of hardware of optimum designs with least number of processes and cost. Descriptions of the model for an air-fuel mixing process, which is the fundamental phenomenon of diesel engine combustion, and combustion model for evaluating performance parameters and nitrogen oxides formation quantity with considerations of air flow and injection system characteristics are given with a calculation example using Komatsu engines. Calculation results on the combustion characteristics (combustion ratio, pressure, mean combustion gas temperature), effect of equivalent ratio on combustion ratio, correlation between penetration distance and engine bore, and correlation between engine bore and excessive air ratio and swirl ratio are given. Calculation examples of engine air flow, variation of kinetic energy of fluid with crank angle, variation of mixing time with crank angle, and other performances are also given.

57681

APTIC NO. 84197

Kraujalis, Maria-Wanda

THE SPATIAL DISTRIBUTION OF ANNUAL QUANTITIES OF HEAT FROM ARTIFICIAL SOURCES IN THE TERRITORY OF THE PEOPLE'S REPUBLIC OF POLAND. (Die räumliche Verteilung der Jahressummen der Wärme aus künstlichen Quellen im Gebiet der Volksrepublik Polen). Text in German. *Z. Meteorol.*, 25(5):312-317, 1975. 40 refs.

The regional distribution of artificial sources of heat and the level of their emission with regard to the determination of the regional distribution of the quantity of the directly consumed fuel was analyzed for annual production in Poland. Primary raw material, such as bituminous and soft coal, natural gas and crude oil, was converted in coking plants, refineries, gas works, electric power plants and long-distance heating systems into secondary energy carriers. A formula was developed permitting an estimate of heat emission levels of the area whose energy balance was known. The smaller the regional units examined, the more the emission level could be approximated. The two parameters involved were indices of thermal efficiency for different conversions into chemical energy in basic industrial branches and climatological data. For 396 regional units, the yearly quantity of emitted heat was evaluated. In order to determine the proportion of the index S (artificial heat) in the thermal balance of the active surface, the quantities obtained were compared with selected components of the radiation balance in which Q_{wa} designated global radiation and E effective radiation on Polish territory. The sums of the emission obtained referred to all areas examined and were not limited to cultivated territories. The total artificial heat emission in Poland in 1965 was about 621,000 Tcal/yr corresponding to 0.25% of the global radiation of 0.66% of effective radiation.

57682

APTIC NO. 76285

Krupkova, Danuta and Aleksander Udrycki

NEW ELECTROLYTIC ZINC PLANTS. *Chem. Age India*, 26(8):597-614, Aug. 1975. 58 refs.

The main technological layouts of new electrolytic zinc plants are outlined. Most of the plants commissioned since 1965 are of large capacity, resulting in better economy and production costs. The roasting of Zn concentrates is performed in large fluid bed roasters, of one average production index for 1 sq m hearth area of 6.7-7.0 tons/day of roasted concentrates. The batch leaching process is adapted to the calcining characteristics. The jarosite, precipitated after slurry, is treated at a high temperature range with strong acid, which is the most used secondary leaching method to improve Zn and cadmium recovery. The new plants work at high output figures, raising the Zn recovery in the plants up to 95-96%. The new plants adopt high temperature methods which accelerate the dissolving action of many compounds in the spent acidic electrolyte, and acts advantageously in the flocculating effects of the particles of iron and silica compounds. The features and operating characteristics of electrolytic zinc plants all over the world are reviewed.

57683

APTIC NO. 82926

Kuroda, Takatsugu, Masaoka Hirose, Hikaru Shoji, and Tsuneo Tsukaya

CORRELATION BETWEEN ENVIRONMENTAL CONCENTRATION AND EMISSION SOURCE. (*Kankyo nodo to hasseigen tonu soka kaiseki*). Text in Japanese. *Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution)*, 10(4):294, 1975. (Presented at the National Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 175.)

The relationship between the emission quantity of sulfur oxides from a single emission source and the environmental SOX concentration measured by the lead dioxide method was investigated in Misaki-machi Osaka, where a thermal power plant (output 462 MW) is located. Based on the data obtained at 14 locations during the period of April 1967-March 1970, Jan.-June 1970, and Jan.-June 1971, correlation coefficients were obtained using a modified Meade-Pasquill equation. Significant correlations were found at almost all locations. Correlation coefficients between each pollutant concentration and traffic volume were calculated. Included in the calculation were TC (traffic volume), sulfur dioxide, nitrogen dioxide, nitric oxide and $\text{NO} + \text{NO}_2$ at 16 wind directions and at no wind. The magnitude of correlation coefficients obtained was on the order of TC-NOx, TC-SO2 and SO2-NOx at no wind,

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TC-NOx and SO2-NOx at no wind and E-wind, TC-NOx and TC-SO2 and also SO2-NOx and TC-NOx at 10 wind directions. Results indicated that the pollution at this location was attributable to automobile traffic at three wind directions and at no wind, and to other pollutant sources at 10 other wind directions.

57684

APTIC NO. 84059

Lange, Werner

ENVIRONMENTAL PROBLEMS IN THE METALLURGICAL INDUSTRY. (*Umweltprobleme der metallurgischen Industrie*). Text in German. *Neue Huette*, 20(12):706-711, Dec. 1975. 6 refs.

Environmental problems in the metallurgical industry are considered with reference to basic trends. They include contaminant concentrations in metallurgical plants, the reorganization of existing plants with current applied technology, modifications of fundamental processes for environmental protection, and development of new methods. Typical substances to be controlled include industrial acids, salts, and lubricants as well as sulfur dioxide, mercury, lead and cadmium. Deficiencies in the reverberatory furnace for copper smelting are discussed also while new methods based on thermal and wet metallurgical processes are being explored for possible use along with direct hydrogen reduction of iron concentrates. Emission levels and maximum allowable concentrations for various substances are critically evaluated.

57685

APTIC NO. 83641

Ledergerber, E.

THE GOAL OF A STABILIZED ENERGY CONSUMPTION. (*Das Ziel eines stabilisierten Energieverbrauchs*). Text in German. *Schriftenr. Schweizer. Ver. Gesundheitstechn.*, vol. 41:73-76, 1975. 6 refs.

A newly conceived energy policy harmonizing ecological factors, energy consumption and socio-economic development was submitted. The supply of fossil energy should last for 30-50 yr with energy consumption doubling or tripling by the year 2000. The waste heat limit for the atmosphere and ocean was set at 300 Tw. This limit would be reached much sooner by an energy increase through nuclear power as apposed to fossil fuel combustion because of the high waste heat production of nuclear power. The carbon dioxide released since industrialization began has already reached 19% of that naturally contained in the atmosphere. Increased atmospheric CO2 content would cause a greenhouse effect at double the CO2 quantity. This would lead to serious climatic changes. The dependence on crude oil as the main energy source can be reduced only by keeping energy consumption constant over the next 20 yr. Solar energy could supply 10% of the total energy consumption within 15 yr with a massive effort, provided that use of energy remained constant.

57686

APTIC NO. 84034

Levitasov, Y. M., A. S. Ovechko, V. B. Faynerman, A. M. Dotsenko, and G. N. Sedov

RADIATING CAPACITY OF FLUE GASES CONTAINING FURNACE DUST. (*Ob izluchatel'noy sposobnosti dymovykh gazov, soderzhashchikh plavil'nyy pyl*). Text in Russian. *Izv. Vysshikh Uchebn. Zavedenii, Chernaya Met.*, no. 10:145-149, 1975. 13 refs.

The radiant and true temperature and the dust concentration of flue gases emitted by a steel smelting furnace were measured. Dust measurements revealed that 70-75% of the dust, with mean particle size of less than 1 micron, is due to sublimation of the molten mass, and 25-30% are slag particles with a probable size of 80 micron. As the specific surface of the latter is about 1 millionth that of the sublimed particles, the contribution of the former to radiation is negligible.

EMISSION SOURCES

57693

57687

APTIC NO. 80030

Lillis, Edward J. and Dexter Young

EPA LOOKS AT FUGITIVE EMISSIONS. *J. Air Pollution Control Assoc.*, 25(10):1015-1018, Oct. 1975. 6 refs.

The characteristics of fugitive emissions (industrial) and fugitive dust emissions are described. Fugitive emissions include both gaseous and particulate emissions that result from industrial related operations and which escape to the atmosphere through windows, doors, and vents, but not through a primary exhaust system, such as a stack, flue, or control system. Fugitive emissions result from metallurgical furnace operations, materials handling, transfer, and storage operations, and other industrial processes where emissions escape to the atmosphere. Fugitive dust emissions are generally related to natural or man associated dusts (particulate only) that become airborne due to the forces of winds, man's activity, or both. Fugitive dust emissions include windblown particulate matter from unpaved dirt roads, tilled farm lands, and exposed surface areas at construction sites. Natural dusts that become airborne during dust storms are included as fugitive dusts.

57688

APTIC NO. 80102

Lindsey, Alfred W.

ULTIMATE DISPOSAL OF SPILLED HAZARDOUS MATERIALS. *Chem. Eng.*, 82(23):107-114, Oct. 27, 1975. 21 refs.

The disposal of hazardous waste materials by incineration is discussed. Organic materials containing dangerous heavy metals (mercury, arsenic, selenium, lead, cadmium) should not be incinerated unless the fate of the metal components in the environment is known or can be satisfactorily controlled by air and water pollution control equipment. The hazard posed by incineration of hazardous materials is largely a function of the amounts, nature, and distribution of the combustion products entering the environment. These products may be undergraded hazardous material, partially degraded toxic breakdown products or hazardous end products such as sulfur oxides, hydrogen chloride, or heavy metals. They may exit as gases or particulates to the atmosphere or in the scrubber water, or as ash residue. All applicable Federal, state and local air emission standards and regulations should be met.

57689

APTIC NO. 76493

Linsky, Benjamin, James Littlepage, Arland Johannes, Rasool Nekooi, and Paul Lincoln

DRY COKE QUENCHING, AIR POLLUTION AND ENERGY: A STATUS REPORT. *J. Air Pollution Control Assoc.*, 25(9):918-924, Sept. 1975. 18 refs.

The environmental and health effects of dry quenching of incandescent coke are discussed. The dry quenching process substantially reduces air pollution caused by coke quenching. Soots and tarry smoke particles are curtailed during the hot coke push and during transportation to the quench tower. The possibilities of long term, detrimental health effects caused by polynuclear hydrocarbon particulates is reduced because of the air pollution reduction. When dry quenched smoke is hatched and/or screened, it tends to make more dust than wet quenched coke, and added dust control measures are required. Suitable control equipment is readily available for dry quenching units that may otherwise allow fugitive coke dust to escape when the unit is charged. (Author conclusions modified)

57690

APTIC NO. 83506

Loitieri, B.

RECENT STUDIES FOR THE PROTECTION OF THE STRATOSPHERE. (*Recents travaux pour la protection de l'environnement stratospherique*). Text in French. *Meteorologie*, 6(1):97-100, June 1975.

The increased threat of modern aviation to the stratosphere has led to extensive work by the SGAC and COVOS to

develop better and additional means of monitoring pollutants. Aerosols emitted by a Concord were found to be undetectable within 30 minutes because of their dilution in the atmosphere and their small size. Research has been most successful in measuring the distribution of secondary constituents; emission and absorption spectrometry on Caravelles, Concorde, and balloons have already provided important information on nitrogen oxides. The development of a control system is being aimed for which will function routinely on commercial planes. The study of the effects of a nitrogen oxides on the total quantity of ozone is made difficult because of the need to establish parameters for turbulent diffusion and transport processes. For the time being, fragmentary models are being developed with the objective of eventually combining them. A bidimensional stationary photochemical model has already made it possible to obtain distributions of secondary constituents well in accord with observations. Biological research so far reveals that, taking direct and diffused ultraviolet radiation into consideration, a small change in the reduced thickness of the ozone layer (1% for example), will entail a double change (2% according to the example) in erythema and carcinogenic effects. Abiotic and nuisance effects are presently being studied in prokaryotes and viruses.

57691

APTIC NO. 76018

Lownie, H. W., Jr. and A. O. Hoffman

STUDY OF CONCEPTS FOR MINIMIZING EMISSIONS FROM COKE-OVEN DOOR SEALS (FINAL REPORT). Battelle Memorial Inst., Columbus, Ohio, Columbus Labs., Environmental Protection Agency Contract 68-02-1439, Program Element 1AB015, ROAP 21AQR-012, Rept. EPA-650/2-75-064, 235p., July 1975. 20 refs.

NTIS: PB 245580/AS

Studies aimed at minimizing particulate emissions from coke-oven door seals were performed. The fundamental cause of emission-releasing gaps in coke ovens appeared to be warpage in the cast iron jamb. Existing metal seals on coke oven doors were not flexible enough to conform to more than a minor amount of jamb bowing. A retrofitable, spring-type, metal-door-seal system that adjusts to the amount of jamb bowing is recommended along with research on the effectiveness of various sealants.

57692

APTIC NO. 84202

Luiga, P. and V. Pikkov

INFLUENCE OF TRAFFIC CONDITIONS ON THE CONTENT OF CARBON MONOXIDE IN AMBIENT AIR. (*Vliyanie rezhima dvizheniya avtotransporta na soderzhanie CO v okruzhaiushchem vozduhe*). Text in Russian. *Eesti NSV Tead Akad Toim*, 24(3):206-209, March 1975. 11 refs.

The influence of traffic conditions on the distribution of carbon monoxide in ambient air was studied using cumulative measurement methods. Samples of filter paper, soaked in a lead chloride solution were exposed for 7 days in traffic. The CO contents in the air at the observation points was measured by using an extinction-registering device to determine the exact quantity of freed metallic palladium. The existence of some specific CO distribution patterns in these areas was found: 1) disturbance of regular rise of CO concentration near points where systematic speed change took place; 2) local rise of CO concentration along narrow streets with houses on both sides, as compared to the open and well ventilated sections of the city.

57693

APTIC NO. 82767

Malte, P. C.

POLLUTANT PRODUCTION FROM FOREST SLASH BURNS. Washington State Univ., Pullman, College of Engineering Research, Rept. 339, 34p., 1975. 9 refs.

Pollutant production resulting from the combustion of forest slash material was determined from measurements obtained

for controlled field burns. Temporal and spatial concentrations of carbon dioxide and total particulates were measured during flights of an instrumented aircraft through the smoke plumes. These data plus laboratory burning-table measurements were used to determine emission indices of CO₂, particulates, carbon monoxide, and nitrogen dioxide. Relatively dry forest slash composed primarily of Douglas fir and larch, with moisture contents of approximately 3% for needles, 10% for twigs, and 30% for the forest floor duff, gave mass ratios of pollutant to burned material of approximately 1.4 for CO₂, 0.016 for particulates, 0.12 for CO, and 0.008 for NO₂. The mass ratio of particulate/CO₂ in the smoke plume of one fire grew during the first hour, whereas another fire plume gave a steady and apparently maximum particulate/CO₂ ratio of 0.014 at the 1-hr point. (Author abstract modified)

57694

APTIC NO. 83497

Malvy, C.

SELECTIVE MATHEMATICAL STUDY OF TOTAL DUST FALL IN THE VICINITY OF AN INDUSTRIAL PLANT. (*Etude mathématique sélective des retombées totales de poussières au voisinage d'une industrie*). Text in French. Pollut. Atmos. (Paris), 17(67):179-184, July-Sept. 1975.

During 6 months, dust fall around a cement plant was measured by a network of gauges located at various distances from the plant. With a system of equations, 4 solutions were arrived at, the detailed study of which made it possible to determine the distribution of the 2 types of dusts (soluble and insoluble) emitted by the plant. On gauges 1 and 3, 1.2 times more electrofilter dust was found than clinker dust, and on gauges 2 and 4, there was 3 times as much clinker dust as electrofilter dust. Thus the system determined the dust coming from the plant out of the total dust concentration. It can be deduced that there is little electrofilter dust fall close to the plant (due to the height of the chimneys) and significant amounts of clinker dust further away from the plant. The fluctuation of the characteristics of the natural dusts and the fact that the parameters used in the system are averages by hypothesis, lead to a certain imprecision in the determination of the secondary parameters: loss by burning of the insoluble dusts not from the plant, and extraction with benzene of the insoluble dusts not from the plant. However, the values of these parameters varied very little from one solution to the other: 0.1, 0.1, 0.1, and 0.3 for the first and 0.11, 0.11, 0.08, and 0.07 for the second. It can be deduced that benzene extraction of urban dusts is 7-10%, and that their destruction by fire is 10-30%. This system is applicable to various types of industrial dusts if the characteristics of the dusts are different from those of other dusts found in the environment.

57695

APTIC NO. 79970

Mammarella, Luigi

INDUSTRIAL PLANTS AND ENVIRONMENTAL POLLUTION. (*Gli insediamenti industriali in rapporto all'inquinamento dell'ambiente*). Text in Italian. Ingegneria (Milan), no. 6:243-258, June 1975.

Sources of industrial pollution contribute less to atmospheric contamination than do domestic heat and combustion pollution. However, industrial stack emissions and the population of areas which are off-limits for health reasons create significant problems. Industrial discharges not only carry contaminants of definite toxicity but also less toxic ones which are produced in massive quantities, such as aerosols and sulfuric anhydride, and which eventually present equally serious problems. Industrial pollution can be characterized at the levels of emission and dispersion. The greater the difference between the fraction released in the air and the fraction infused into the lower atmosphere, the higher the altitudes of the discharges and the more favorable the meteorological conditions of the zone will be. This consideration makes the choice of a site for plant construction with the checking of diffusion with tracers very important. Pollution control costs are significant

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cantly lowered by such preventive action preceding construction. It has been determined that aerosols should not exceed 0.30 mg/cu m, sulfur dioxide 0.15 ppm, nitrogen dioxide 0.10 ppm, and carbon monoxide 80-90 ppm.

57696

APTIC NO. 76155

Manos, M. J.

AIR POLLUTION EMISSION TEST. GASOLINE VAPOR EMISSION LABORATORY EVALUATION. PARTS 1 AND 2. Scott Environmental Technology, Inc., San Bernardino, Calif., Office of Air and Waste Management Contract 68-02-1400, Tasks 6 and 15, Rept. 75-GAS-6, 120p., Aug. 15, 1975.

The effects of different controlled variables on the gasoline vapor quantity returned via a vapor control system during vehicle tank refueling were evaluated. Vapors displaced from the vehicle tank during refueling were contained within a vapor control system by using a vapor recovery nozzle and a vapor return hose which directed the vapors through a dry gas meter and subsequently to a vapor sample bag. Increasingly negative values of the temperature difference between the vehicle tank fuel and the dispensed fuel caused an increase in the volume of vapor returned, and increasing positive values of the above temperature differential caused a decrease in the vapor volume returned. At a temperature differential equal to 0 F, the volume of vapor returned was unaffected by the quantity of fuel dispensed. At temperature differential values of +15 F, a 5 gallon fill resulted in the lowest volume of vapor returned. Dispensing rate exerted no effect on the volume of vapor returned. Comparative tests using fuels with 8.8 and 12.0 lb/sq in. Reid Vapor Pressure revealed 70% higher vapor mass values for the latter fuel. An evaluation of the Leak Test Method for predicting vapor losses during refueling is also presented along with a survey of vehicle fuel system vapor leak characteristics.

57697

APTIC NO. 76151

Marks, Peter J., James W. Davison, Michael C. Carey, and Kenneth L. Seace

AIR POLLUTION EMISSION TEST. ALAN WOOD STEEL COMPANY (FINAL REPORT). Weston (Roy F.), Inc., West Chester, Pa., Office of Air and Waste Management Contract 68-02-0240, Task 7, Rept. 73-BOF-1, 114p., Dec. 14, 1975. 3 refs.

Continuous opacity monitoring was performed on particulate emissions from the basic oxygen furnace electrostatic precipitator outlet stack at the Alan Wood Steel Company in Conshohocken, Pennsylvania to assess the effect of process operation variations on opacity emissions and to development guidelines for monitoring instrument reliability during performance certification. The continuous monitoring opacity system used consisted of a stack mounted electro-optical Lear Siegler transmissometer and an opacity converter unit. The program included both laboratory and field testing. Laboratory tests indicated that the transmissometer was well within specification. The continuous monitoring data are reported as number of 6-minute averages over opacities ranging from 5-30%.

57698

APTIC NO. 82427

Matsuoka, Shin

COMBUSTION AND EXHAUST EMISSION IN THE SPARK IGNITED ENGINE. (*Hibana tenka kikan no nensho to haiki*). Text in Japanese. Nainen Kikan (Internal Combust. Engine), 14(12):77-88, Oct. 1975.

The formation and emission mechanisms of carbon monoxide, nitrogen oxides, and hydrocarbons in spark ignition engines are reviewed. The variation in CO concentration with time and the effect of air-fuel ratio on this variation are discussed. The formation mechanism, formation rate, and effects of various factors on NO formation are reviewed. Incomplete combustion due to an insufficient air supply, low temperature, insufficient

reaction time, excessive inert gas, and inadequate fuel supply are discussed with respect to HC formation. A temperature model for estimating NO formation is given, with the calculation method. In the NO formation calculation, the effects of the crank angle, combustion gas temperature, pressure in the intake pipe, engine speed, ignition timing, fuel consumption rate, and emission pattern are discussed. A calculation model for NO_x formation in a stratified charge engine with a prechamber is also given.

57699

APTIC NO. 84113

Matsuura, Hisako and Setsuko Noma

HEAVY METALS IN DUSTFALL AROUND THE REFINERIES IN HIROSHIMA PREFECTURE.

(*Hiroshimakenka ni okeru seirensyo shuhen no koka baijin chu no jukinzoku ni tsuite*). Text in Japanese. *Hiroshimaken Eisei Kenkyusho Kogai Kenkyusho Kenkyu Hokoku* (Bull. Lab. Pub. Health Hiroshima Pref. and Hiroshima Pref. Inst. Environ. Sci.), vol. 1975:39-41, March 1975. 5 refs.

Twenty sampling sites were selected around non-ferrous metal refineries in Takahara for an initial investigation conducted from June through November of 1973, and seven sites for a secondary investigation from December 1973 to November 1974. The dustfall was sampled by a cylindrical glass dust jar which was placed outside for a month. Atomic absorption spectrophotometry with a n-butyl acetate extraction was used for analysis of cadmium, lead, copper and zinc, and the o-phenanthrene method for analysis of iron. The initial investigation obtained a high count of heavy metals except iron in four sampling sites which were located close to the copper and lead refineries. However, the heavy metal polluting range of the two refineries was within a few kilometers of the source of the pollution. For the secondary investigation the sampling sites were located within 10 km of a copper refinery. The correlation between the percentage of the metals in the dustfall and the distance from the source of pollution was derived.

57700

APTIC NO. 81701

Matthews, P. J.

LIMITS FOR VOLATILE ORGANIC LIQUIDS IN SEWERS. PART I. Effluent Water Treatment J. (London), 15(11):565-567, Nov. 1975. 13 refs.

Equations to calculate the relationship between atmospheric and aqueous concentrations of volatile organic liquids in sewers are presented. The solubility and volatility of an organic liquid is used to obtain a quantitative relationship between aqueous and atmospheric concentrations by determining the vapor pressure composition curves. Both theoretical limit values and lower explosive limit values in a sewer are calculated under theoretical conditions. Theoretical conditions in a sewer are those in equilibrium with no ventilation. The limits allow for the solubility, volatility, and toxicity of the organic liquids and for the temperature of the receiving sewage.

57701

APTIC NO. 76144

McKnight, J. S.

EFFECTS OF TRANSIENT OPERATING CONDITIONS ON STEAM-ELECTRIC GENERATOR EMISSIONS (FINAL REPORT). Research Triangle Inst., Research Triangle Park, N. C., Environmental Protection Agency Contract 68-02-1325, Program Element 1AB013, ROAP 21BAV-002, Task 10, Rept. EPA-600/2-75-022, 113p., Aug. 1975. 14 refs.

NTIS: PB 247701/AS

The relationship between atmospheric emissions and the operation of coal-fired steam generators (equipped with particulate cleaning devices only) under transient or upset conditions is reviewed. Startups, shutdowns, load changes, fuel quality variations, electrostatic precipitator malfunctions, and other operating variables affect the emission of particulates and nitrogen oxides. Process variables do not affect the mass

emission rate of sulfur oxides which is proportional to the fuel supplied to the boiler and to the sulfur content of the fuel. Adequate data under carefully controlled and monitored conditions are not available for a thorough characterization of the effect of transient conditions on gaseous emission rate. (Author conclusions modified)

57702

APTIC NO. 82574

McLane, J. E., R. B. Finkelman, and R. R. Larson

MINEROLOGICAL EXAMINATION OF PARTICULATE MATTER FROM THE FUMARoles OF SHERMAN CRATER, MT. BAKER, WASHINGTON (STATE). Preprint, Geological Survey, Reston, Va., 2p., 1975.

Samples of particulate matter ejected from the fumaroles of Sherman Crater, Mount Baker in Washington State and collected periodically since March 1975 were analyzed by means of optical and scanning electron microscopy, electron microprobe analysis, X-ray diffractometry, emission spectrophotometry. The most abundant particulate types in the samples were spherules of ortho-rhombic sulfur, most of which were coated with a layer of euhedral pyrite crystals. These spherules constituted about 30-40% by volume of the particulate matter and accounted for the bulk of the sulfur present. Other elements identified included silicon, aluminum, iron, potassium, magnesium, calcium, sodium, titanium, phosphorus, and manganese.

57703

APTIC NO. 81751

Meaden, James B.

ROTARY INTERNAL COMBUSTION ENGINE. (Assignee not given.) U. S. Pat. 3,913,533. 6p., Oct. 21, 1975. 4 refs. (Appl. June 14, 1973, 1 claim).

A rotary internal combustion engine design which involves a minimum of moving parts and is highly efficient in operation is described. The engine is extremely smooth in operation and produces a relatively high speed crank shaft rotation with a relatively low speed of orbital or gyratory rotor movement. The design permits a highly simplified valve operating mechanism by doing away with a separate cam shaft and the gearing for driving the cam shaft.

57704

APTIC NO. 79653

Merian, E.

ENVIRONMENTAL PROBLEMS AND ENVIRONMENTAL RESEARCH IN THE TEXTILE INDUSTRY. (Umweltprobleme und Umweltforschung in der Textilindustrie). Text in German. Textilveredlung (Basel), 10(6):221-227, 1975. 20 refs.

A general model of social development, economic growth, and environmental protection is presented, and efforts made in the environmental protection area in the textile industry in Switzerland are reviewed. The Swiss textile industry causes more water pollution than air pollution. Intense research is being conducted concerning the prevention of air pollutant emissions at their source. Exhaust systems for dust and oil separation have been installed in an increasing number of textile mills. Heavy gasoline and perchloroethylene are being increasingly replaced by fluorinated hydrocarbons in dry-cleaning operations. Malodorous and corrosive spinning oils are separated by ionization in electrostatic precipitators after preliminary filtration.

57705

APTIC NO. 79697

Michalak, Lidia

AIR POLLUTION BY A CEMENT PLANT AT CHELM LUBELSKI. (Zanieczyszczenia powietrza atmosferycznego przez cementownię w Chelmie Lubelskim). Text in Polish. Ochrona Powietrza (Warsaw), no. 3:81-86, 1975. 15 refs.

The results of a 5-year study of dust deposit measurements in the vicinity of a cement factory are discussed. Cement dust, because of its high silicate content, adversely affects bronchi,

nose, and ears, causing pulmonary edema and cementosis, chronic conjunctivitis and inflammation of the eye ball. In order to protect man and his environment and to limit loss of an important raw material (blown away as dust), control measures were studied. Dust samples were taken from collecting points at a distance of 500-3000 m from the factory and examined for their calcium content. Contact candles were used to check on the sulfur dioxide content (SO₂) of the air. Average annual and monthly dust deposits were determined. About 83% of the 47,068 ton (2% of production) was emitted from the smoke stacks in the fumes of the cement furnaces. Analysis of the results revealed that the quantity of dust deposits depended on the distance and position of the collecting points from the emission source; dust pollution of the air was linked to air turbulence and convection. The level of the mean dust deposits was reduced from 328 ton/sq km/yr at a distance of 500 m to 91 tons/sq km/yr at 3000 m. Due to the fact that the prevailing wind direction around the cement factory was southwesterly, the highest dust deposit (225 ton/sq km/yr) was located at northeasterly points, the lowest to the south of the emission source. Periods of highest dust accumulation occurred in August, September and December because of low wind velocity and little precipitation. Analysis of dust emission from the smokestacks showed a chemical composition of calcium oxide (CaO) (43.2%), silicon dioxide (SiO₂) (13.5%), aluminum (Al₂) (4.2%), sulfur trioxide (SO₃) (3.45%), magnesia (MgO) (2.7%), and ferric oxide (Fe₂O₃) (2.1%). Maximal average quantity of calcium in dust samples was found at 500 m to the northeast from the emission source. Waste gases from the smokestacks contained carbon dioxide (6-30%), oxygen and nitrogen (up to 70%), also carbon monoxide, sulfur dioxide and hydrogen sulfide. In order to reduce the harmful effect of dust gases, it was recommended to surround the factory with a greenbelt, particularly from the westerly and southwesterly sides, while employing technical control measures.

57706

APTIC NO. 76334

Mills, J. G. and M. A. Zwarich

HEAVY METAL CONTENT OF AGRICULTURAL SOILS IN MANITOBA. *Can. J. Soil Sci.*, 55(3):295-300, Aug. 1975. 17 refs.

The content of mercury, lead, cadmium, copper, zinc, chromium, and nickel in the agricultural soils of southern and western Manitoba was investigated. The background levels of these metals in uncontaminated soils as well as the extent of contamination from agricultural, automotive, and urban sources was determined. Heavy metal concentrations in the surface soils are closely related to concentrations in the soil parent materials. Agricultural practices have no detectable effect on the heavy metal content of the soil. Some accumulation of Pb is found in soils adjacent to highways and in the Winnipeg urban area. The levels decrease at first with distance from the highway, and then approach constant values. There is little or no contamination of agricultural soils with Hg, Cd, Cu, Zn, Cr, or Ni. (Author abstract modified)

57707

APTIC NO. 82414

Mitsuki, I., Y. Nakagawa, and T. Takada

REACTION OF ENVIRONMENTAL POLLUTION BY HEAVY METALS WITH PLANTS PART 2. MAINLY ON THE INTAKE OF CADMIUM, LEAD AND ZINC INTO PLANTS. (*Jukinzokuosen to shokubutsu no hanna 2. Shutohite cadmium, namari, aen no shokubutsu e no torikomino tsuite*). Text in Japanese. *Hyogo-Ken Kogai Kenkyusho Kenkyu Hokoku* (Rept. Public Nuisance Res. Inst., Hyogo Prefect.), no. 7:22-27, 1975. 4 refs.

The relationship between environmental concentrations of cadmium, lead, and zinc, and the content of these metals in plants such as *Firmiana platanifolia*, cherry trees, ginkgos and platanus trees grown around a zinc refinery was studied. It was found that *F. p.* was a suitable indicator (platanus was not). The content of cadmium and lead in leaves of ginkgo and

cherry trees showed an exponentially decreasing tendency as a function of distance from the refinery. The content of cadmium, lead and zinc in the soil and the distance from the refinery showed no clear correlation. There was no correlation between the content of cadmium, lead and zinc in the leaves and that in the soil. However, a good correlation between the amount of cadmium and that of lead in leaves and in soil, respectively, was found. This was also true for cadmium and zinc.

57708

APTIC NO. 76113

Mobley, C. E. and A. O. Hoffman

A STUDY OF FERROALLOY FURNACE PRODUCT FLEXIBILITY (FINAL REPORT). Battelle Memorial Inst., Columbus, Ohio, Columbus Labs., Environmental Protection Agency Contract 68-02-1323, Program Element 1AB015, ROAP 21AUY-011, Task 18, Rept. EPA-650/2-75-063, 81p., July 1975. 21 refs.

NTIS: PB 247273/AS

A review of the effect of electric-arc ferroalloy furnace design (open versus totally sealed furnaces) on product flexibility in the United States ferroalloy industry is presented. Sealed furnaces equipped with appropriate emission control devices appear to offer the potential for significantly less particulate emissions than open-hooded furnaces. However, sealed ferroalloy furnaces are less flexible than comparable open-hooded furnaces. The feasibility of smelting all of the common ferroalloys in sealed furnaces is not yet demonstrated. Ferroalloy producers are reluctant to install sealed furnaces until either a long-term market demand is assured for sealed-furnace products or the feasibility for smelting all of the ferroalloys is demonstrated.

57709

APTIC NO. 83412

Moran, John B.

THE ENVIRONMENTAL IMPLICATIONS OF MANGANESE AS AN ALTERNATE ANTIKNOCK. Preprint, Society of Automotive Engineers, New York, 57p., 1975. 18 refs. (Presented at the Society of Automotive Engineers Automotive Engineering and Manufacturing Meeting, Detroit, Mich., Oct. 15, 1975, Paper 750926.)

The environmental implications of manganese as an alternative antiknock agent to lead for gasoline are reviewed in terms of its effects on exhaust emissions, emission control devices, and its toxicity to humans. The use of manganese in gasoline, while not posing a direct disbenefit to public health in itself, results in detrimental effects on some regulated and non-regulated emission products, particularly hydrocarbons, aldehydes, and particulates. The effect of manganese on catalyst efficiency appears to be insignificant. The available data on manganese do not point to a significant adverse effect within the context of Section 211 of the 1970 Clean Air Act. (Author conclusions modified)

57710

APTIC NO. 79254

Morgan, C. R. and S. S. Hetrick

TRADE-OFFS BETWEEN ENGINE EMISSION CONTROL VARIABLES, FUEL ECONOMY, AND OCTANE. Society of Automotive Engineers, Warrendale, Pa., Soc. Automotive Engrs. Automot. Eng. Congr. Expos., Detroit, Mich., 1975, 32p., 14 refs. (Feb. 24-28.)

A single cylinder removal dome head spark ignition gasoline engine operating at constant speed and load was used to study the effects of compression ratio, spark timing, exhaust gas recirculation (EGR) rate, and air/fuel (A/F) ratio on exhaust emissions, fuel economy and octane requirements. An appendix describes the test procedure. Analyses showed that fuel consumption decreased with increasing compression ratio at any given nitrogen oxides emissions level, so that minimum fuel consumption was obtained at the highest compression ratio studied when base engine hydrocarbon emissions were constrained at constant low levels by optimal adjustments of

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EGR and spark timing, both the minimum fuel consumption and minimum octane for trace knock were achieved at the lowest compression ratio studied. Furthermore, overall minimum fuel consumption at controlled HC and NOx levels was obtained at the leanest A/F ratio (15.4) studied. Therefore, these data indicate that the historically accepted improvement in engine efficiency with increasing compression ratio may not always be achieved when HC and NOx must be constrained due to emission requirements. (Author abstract modified)

57711

APTIC NO. 76068

Morgenstern, L.

SUMMARY REPORT ON MODELING ANALYSIS OF SELECTED POWER PLANTS IN 128 AQCRS FOR EVALUATION OF IMPACT ON AMBIENT SO₂ CONCENTRATIONS, VOLUME I (FINAL REPORT).

Abcor, Inc., Cambridge, Mass., Walden Research Div., Office of Air and Waste Management Contract 68-02-1484, Program Element 2AC129, Rept. EPA-450/3-75-062, 606, 80p., June 1975. 13 refs.

NTIS: PB 246081/AS

The results from dispersion modeling analyses of 195 power plants in 60 Air Quality Control Regions are presented as part of an effort to evaluate the impact of power plant operations on ambient sulfur dioxide concentrations. Among the 195 power plants modeled for 1972 operations, sulfur dioxide emissions from approximately 20 plants resulted in concentrations which, by themselves, exceeded the primary 24-hour SO₂ standard. Emissions from none of the plants for which an annual SO₂ prediction was obtained exceeded the primary annual SO₂ standard. (Author abstract modified)

57712

APTIC NO. 76070

Morgenstern, L.

SUMMARY REPORT ON MODELING ANALYSIS OF POWER PLANTS FOR FUEL CONVERSION (FINAL REPORT). Abcor, Inc., Cambridge, Mass., Walden Research Div., Office of Air and Waste Management Contract 68-02-1377, Program Element 2AC129/2AH136, Task 2, Rept. EPA-450/3-75-064, Abcor 504, 47p., May 1975. 12 refs.

NTIS: PB 246146/AS

A dispersion modeling analysis of specific power plants selected as candidates for fuel conversion from oil to coal was conducted to evaluate the impact of these conversions on ambient sulfur dioxide and particulate concentrations. Among 63 power plants modeled for 1972 base case operations, SO₂ emissions from seven plants resulted in concentrations which exceeded the primary 24-hour SO₂ standard at nominal load, exclusive of other background source contributions. Concentrations from 10 plants were predicted to exceed the standard under maximum load operation. Emissions from 16 of the plants appeared capable of producing by themselves 24-hour SO₂ concentrations which exceed the primary standard. Emissions from none of the plants produced concentrations which alone exceeded the primary 24-hour particulate standard for 1972 operations under either nominal or maximum load. No annual standards were exceeded by any of the 63 plants alone. (Author abstract modified)

57713

APTIC NO. 80166

Morita, Masatoshi, Shuichi Mimura, and Shinshi Oishi

OCCURRENCE OF CHLORINATED BENZENES IN ENVIRONMENT. Preprint, International Congress of Scientists on the Human Environment, p. 68, 1975. (Presented at the International Congress of Scientists on the Human Environment, Kyoto, Japan, Nov. 17-26, 1975.)

Chlorinated benzenes identified in human fat were p-dichlorobenzene, hexachlorobenzene, 1,2,4,5-tetrachlorobenzene, and pentachlorobenzene; and the average residue levels were 2, 0.2, 0.02, and 0.01 microgram/g, respectively. P-dichlorobenzene, pentachlorobenzene, and hex-

achlorobenzene were identified in sewage and sludge collected from six sewage plants. Mean concentrations were 1.2, 0.002, 0.003 microgram/l in raw sewage and 1.2, 0.021, and 0.038 microgram/g in activated sludge, respectively. P-dichlorobenzene was detected in ambient air at the level of 2 microgram/cu m outdoors in Tokyo and was found in pigeon fat at rather higher levels than in human fat. P-dichlorobenzene was found in chicken, pork, beef, and sometimes fish, but was hardly detectable in vegetables and rice. Hexachlorobenzene was also found in foods, especially fish and milk products. The daily intake estimated through food analysis was about 0.6 microgram/day/60 kg, about one sixtieth of the recommended value given by the World Health Organization. Accumulation of p-dichlorobenzene was observed in rats exposed to air containing p-dichlorobenzene. The half life of hexachlorobenzene in rats was about 60 days.

57714

APTIC NO. 75210

Mullins, Billy J., Jr., Dehn E. Solomon, Gary L. Austin, and Linda M. Kacmarcik

ATMOSPHERIC EMISSIONS SURVEY OF THE SOUR GAS PROCESS INDUSTRY (FINAL REPORT). Ecology Audits, Inc., Dallas, Tex., Office of Air and Waste Management Contract 68-02-1865 Modification 1, Rept. EPA-450/3-75-076, 757-01, 134p., Oct. 1975. 42 refs.

NTIS: PB 251070

An inventory of emissions from gas sweetening processes (the removal of hydrogen sulfide from natural gas) is presented. Emissions from gas sweetening are the combustion products of the acid waste gases following their removal from the raw natural gas and consist mainly of sulfur dioxide. Negligible emissions of particulates, nitrogen oxides, hydrocarbons, and carbon monoxide are also generated. An emissions factor for SO₂ is developed, and SO₂ emissions from gas sweetening are directly proportional to the mol percentage of H₂S in the intake gas to the sweetening plant. Emissions are calculated by multiplying the whole number representing mol percent H₂S by a factor of 1685 to get lb of SO₂/million cu ft of intake gas sweetened. When the concentration of H₂S is not known, a table is used giving average H₂S concentrations in gas produced in Air Quality Control Regions. New Source Classification Codes are proposed for the industry, and a list of over 1000 gas processing plants is presented with notes on their emissions. (Author abstract modified)

57715

APTIC NO. 84613

Murakami, Takehiro

ATMOSPHERIC HYDROCARBONS IN YOKOHAMA-KAWASAKI-YOKOSUKA INDUSTRIAL AREA.

(*Keihin kogyo chiiki ni okeru taikichu no tankasuisobushitsu no sokutei kekka.*) Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):585, 1975. (Presented at the Japan. Society of Air Pollution, Annual Meeting, 16th, Niigata, Nov. 5-7, 1975, Paper 316.)

Atmospheric hydrocarbon levels in relation to a mobile emission source were studied. The sampling location was chosen so that only automobile contributions would be considered, and a residential area in Kawasaki City was selected. One major highway crosses this area. The sample air was collected by a liquid oxygen cold trap method and analyzed by gas chromatography. Determinations were made for isobutane, n-butane, isopentane, n-pentane, 2-methyl pentane, 3-methyl pentane, n-hexane, 2-methyl hexane, 3-methyl hexane, n-heptane, benzene, toluene, and three xylene isomers. The data were tabulated for total concentrations of hydrocarbons excluding iso-butane, n-butane, isopentane, n-pentane, 2-methyl pentane, 3-methyl pentane, and n-hexane. The ratio (mole %) between the C₄, C₅ and C₆ hydrocarbons and the above total hydrocarbons was calculated. The average ratios found were 76 and 50 for summer and winter measurements, respectively. The average concentrations of total hydrocarbons were 82 ppb for summer and 26 ppb for winter. The average ratio found for the

summer sampling was close to the C4, C5, and C6 compositions in gasoline, while that found for winter was close to the C4, C5, and C6 compositions in gasoline vapor.

57716

APTIC NO. 83864

Muramatsu, Manabu, Jyojiro Iwamoto, Keiichi Honma, Ikuro Kakizaki, Atsuko Emoto, Chikara Kikuchi, and Kikuji Kimura

NITROGEN OXIDES AND SUSPENDED PARTICULATE MATTER IN CIGARETTE SMOKE. (*Kitsuen ni yoru oshibutsu no hasseiryō - Chissosankabutsu oyobi ryūjo busshitsu ni suite*). Text in Japanese. Taiki Osen Kenkyū (J. Japan. Soc. Air Pollution), 10(4):375, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 122.)

The amount of nitrogen oxides, carbon monoxide, and suspended particulate matter generated by cigarette smoking was investigated. Clean air purified by activated carbon was used to fill an 18 cu m sealed room, and ten cigarettes were lighted every 30 min. Two different smoke generation methods were used: a normal smoking condition, and leaving a lighted cigarette without puffing. In the former condition, the amount of generation/one cigarette was 0.32 to 1.08 ml NO_x, 38 to 72 ml CO, and 7.7 to 12.6 mg suspended particulate matter. With the latter method, the amounts were 0.88 to 1.26 ml NO_x, 42 to 59 ml CO, and 6.3 to 7.8 mg suspended particulate matter.

57717

APTIC NO. 84359

Murphy, Zane E.

COAL SUPPLY - SHORT AND LONG TERM PERSPECTIVES. Air Pollution Control Assoc., Pittsburgh, Pa., Mid-Atlantic States Section, Air Pollution Control Assoc. Semi-Ann. Tech. Conf. Proc. Sulfur Fuels - Problems Alternative Solutions, Wilmington, Del., 1975, p. 25-42. (April 25.)

Estimated coal reserves in the United States are discussed in relation to future trends in utilization and environmental constraints. About 89% of the country's fossil fuel reserves are in the form of coal which totals some 184 billion tons. Coal reserves lying east of the Mississippi comprise 46.3% of the total identified reserves, and about 83% of this is amenable to underground mining. About 32.8 billion tons of this eastern coal has a sulfur content of less than 1%. Approximately 99 billion tons or 76% of the 131 billion tons of western underground reserves contain less than 1% sulfur, although about 59% of this low sulfur coal cannot compete with eastern mined coal because of the transportation cost. Coal production is expected to rise to 755 million tons in 1977 and 1300 million tons in 1990, assuming a continuation of pre-embargo air pollution constraints. The Environmental Protection Agency supports legislation that allows air quality compliance dates for coal-fired electric power plants to extend to 1979 if necessary.

57718

APTIC NO. 82878

Myers, John L.

HANDLING ASBESTOS. CHRYSOTILE ASBESTOS IN PLASTICS. J. Paint Technol., 47(611):63-66, Dec. 1975. 13 refs. (Presented at the Management Seminar, San Francisco, Calif., June 16, 1975.)

The different types of asbestos and their many uses are discussed, along with government regulations controlling the use of asbestos. The health hazards associated with asbestos, both occupational and environmental, and some industrial experience with air sampling and dust control measures are also covered. Although all forms of asbestos are hazardous to health when inhaled excessively, there is growing evidence that crocidolite and amosite are more hazardous than chrysotile. Fortunately, the plastics industry uses primarily chrysotile asbestos and, in most products, the fibers are locked-in to prevent airborne contamination. Although asbestos dust levels are generally lower than expected, efforts continue to be made to further improve the quality of the

workplace. Although the general public is not currently in danger, occupational controls are necessary to prevent future environmental contamination. (Author abstract modified)

57719

APTIC NO. 82622

Nagda, Niren L. and Lyndon R. Babcock, Jr.

HEALTH-IMPACT ASSESSMENT OF SOURCES OF AIR POLLUTION. Preprint, Purdue Univ., Lafayette, Ind., School of Civil Engineering, APCB, Environmental Protection Agency, Washington, D. C., and Indiana Univ., Bloomington, 26p., 1975. 15 refs. (Presented at the Purdue Air Quality Conference, Annual, 14th, Indianapolis, Ind., Nov. 12-13, 1975.)

The development and use of a methodology for ranking the relative importance of sources of air pollution based on population exposure and health effects are described. The computer model, called Popex, consists of three submodels: dispersion, population exposure, and health effects. Optimal sophistication and balance of details among the submodels were emphasized in this integrative computer model. Many assumptions and simplifications were still necessary. The Popex model was applied to sources of air pollution in the Chicago Air Quality Control Region. The results show that 17 out of a total of 227 categories of sources contribute nearly 80% to the total air-pollution-population-effect problem. These 17 categories include commonly recognized large sources, such as automobiles and large utility and industrial boilers, as well as less-recognized categories, such as solvent evaporation from industrial operations involving surface coatings. (Author abstract modified)

57720

APTIC NO. 80162

Nakado, T.

THE PRESENT STATE AND FUTURE PROSPECT OF PUBLIC NUISANCE CONTROL MEASURES FOR CONSTRUCTION MACHINERY DIESEL ENGINES. (*Kensetsukikai yo diesel engine no kogai taisaku no genjo to shorai*). Text in Japanese. Mitsubishi Juko Giho Mitsubishi Heavy Ind. Tech. Rev., 12(4):437-443, 1975. 6 refs.

The emission control law for construction machinery diesel engines for use in underground mining has been enforced for a long time. A general control law for these engines has yet to be proposed. Diesel engines contributed 1% of the total carbon monoxide emission in Japan in 1971, compared to 99% for gasoline engines. The contribution rates for hydrocarbon, nitrogen oxides, and dusts from diesel engines in the same year were 14.6%, 51.5%, and 85%, respectively. In 1971, approximately 90% of the light oil was consumed by automobile diesel engines while the remaining 10% was consumed by construction machinery diesel engines. The latter are often operated at low speed, generating a large quantity of smoke. A boost controller is generally used to cut the fuel supply from time to time in accordance with the gas inlet pressure, cutting the high smoke concentration resulting from the delay of the increase of the gas inlet pressure.

57721

APTIC NO. 84002

Nakajo, Etsuji, Tokio Nakaoka, Kimio Kuroda, Masataka Tanioka, and Yoshimichi Kawara

INVESTIGATION ON ENVIRONMENTAL POLLUTION CAUSED BY AUTOMOTIVE EXHAUST EMISSION. NO. 2. POLLUTANT DETERMINATION AT HIGHWAY NO. 1. (*Jidosha haigasu no kankyochosa ni suite*). Text in Japanese. Preprint, Japan Society of Public Health, Tokyo, p. 395, 1975. (Presented at the Japan Society of Public Health, Lecture Meeting, 34th, Yokohama, Oct. 1975.)

Environmental pollution due to automotive exhaust emission was investigated. Concentrations of carbon monoxide, nitrogen oxides, sulfur oxides, hydrocarbons and suspended particu-

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lates (heavy metal, tar) were measured at the intersection of Highway No. 1 in Imaichi city and at the Furuichi elementary school located 200 m from the intersection. The wind direction, wind velocity, noise, and traffic volume were also measured. Concentrations of CO, NO_x, HC and suspended particulates were higher at the intersection, indicating the effect of automotive exhaust emission. Variation patterns of CO and nitric oxide concentrations were similar to those of traffic volume, which indicated that these pollutants were attributable to automotive exhaust emission. Effects of automobile traffic on noise level were also evident.

57722

APTIC NO. 82349

Nakamura, N. and K. Suzuki

PNEUMOCONIOTIC MINERALOGICAL STUDIES ON SMOKY DUST FROM ELECTRIC FURNACES FOR MAKING IRON PART 2. (*Denkino seitetsu enjin no junkaikobutsuteki kenkyu 2*). Text in Japanese. Preprint, Japan Science Council, Tokyo, p. 247-248, 1975. (Presented at the Japan Science Council Material Research Lecture Meeting, 19th, Tokyo, Oct. 7-8, 1975.)

The frequent occurrence of dermatitis of unknown origin in Ishinomaki was attributed to the smoky dust from electric furnaces at the Ito Iron Foundry. Almost all of the smoky dust consisted of oxide minerals. Chromium compounds contained in the dust were monocalcium dichromium silicate, ferric chromite, magnesium chromite, and zinc chromite. According to Baetjer, they are stable and relatively harmless to living things. The smoky dust consisted of ultrafine particles with the properties of semi-conductors. They tended to aggregate as round particles 20-50 micron in diameter, and therefore are not thought to cause pneumoconiosis, or to be a likely cause of lung cancer even if inhaled.

57723

APTIC NO. 81626

Nakato, Tusneo

CONSTRUCTION MACHINERY AND EMISSION GAS REGULATIONS. (*Kensetsu kikai to haiki gasu kisei*). Text in Japanese. *Kensetsu Kikai (Constr. Mach.)*, 11(8):64-70, July 1975. 5 refs.

Stringent control measures for diesel engines are expected soon. The diesel combustion mechanism is more complicated and less understood than that of gasoline engines. Besides control by decreasing emissions from the combustion chamber, the trapping of emitted matter and its secondary treatment is being considered. The latter method may cause secondary pollution; control of black smoke may increase nitrogen oxides. Barium fuel additives have been tried, but there is no proof that barium compounds emitted in exhaust are harmless. The use of exhaust filters is another possibility. For tunnel construction there are wet systems (water muffler) and dry, centrifugal systems. Use of water mufflers is limited; the tanks take up space. In order to lower combustion temperature, timing retardation may be considered. No adequate catalyst has yet been developed, as the exhaust temperature is lower than in gasoline engines. Oxidation is insufficient, and is accompanied by black smoke, which shortens the life of the catalyst. There is an acute need for a muffler, but no practical one has been produced. Recently, not only exhaust gas, but problems of odor are looming.

57724

APTIC NO. 81950

Naugle, Dennis F.

ENVIRONMENTAL ANALYSIS OF POSSIBLE SULFUR INCREASES IN USAF JET FUELS. Air Force Weapons Lab., Kirtland Air Force Base, N. Mex., Proj. 2103, Program Element 63723F, Rept. AFWL-TP-74-215, 22p., Feb. 1975. 5 refs.

NTIS, DDC: AD/A-006 802

The question of whether environmental considerations should be the limiting constraint to possible increases in sulfur content of Air Force jet fuels is addressed. Such increases are

proposed in order to increase the availability of jet fuels. Three sulfur content levels were considered. Values of 0.05% sulfur by weight were chosen to represent the current average level; 0.4%, which is the current maximum limit specification, and 1.0%, to represent a hypothesized higher level for consideration. Since essentially all sulfur is oxidized to sulfur dioxide when combusted in a turbine engine, the emission indexes are constant over all engine operating modes when normalized by fuel usage. These values were calculated to be 1.0, 8.0, and 20.0 g SO₂ per kg of fuel combusted and correspond to the 0.5, 0.4, and 1.0% sulfur levels, respectively. The predicted SO₂ ambient air quality levels are considerably below the legislated standards for projected maximum sulfur levels as well as current sulfur levels. These projected concentrations are only for the worst case situation. Typical concentrations will be even much less than these values for Air Force bases with average emission levels, wind directions other than parallel to the runway, higher wind speeds, and for receptors more distant than 2 km from the runway center. Environmental SO₂ concentrations would not be measurable under typical conditions. Increasing the sulfur content in jet fuel by a factor of 20, as hypothesized, would not cause serious environmental consequences. The upper limit for sulfur in jet fuels should therefore be governed primarily by engine durability factors. (Author abstract modified)

57725

APTIC NO. 82451

Neiser, J. and V. Masek

ON THE QUALITY OF THE SOLUBLE FRACTIONS OF RESPIRABLE AND NON-RESPIRABLE FLY DUSTS.

(*Zur Qualitat der loslichen Anteile von lungengangigen und nicht lungengangigen Flugstauben*). Text in German. *Zbl. Arbeitsmed.*, 25(10):298-306, 1975.

Respirable (below 10 micron) and non-respirable dust fractions sampled at different points in a coking plant were analyzed for their soluble hydrocarbon contents by extraction with hexane, cyclohexane, and benzene, chromatographic separation, and pyrochromatographic identification at 600 C. The hydrocarbons identified in the extracts were C1-C4 hydrocarbons, n-pentane, isohexane, unsaturated C6 hydrocarbons, cyclopentane, n-hexane, hexene, methylcyclopentane, benzene, cyclohexane, methylcyclohexane, toluene, 1,2-dimethylcyclohexane, cyclohexene, ethylbenzene, m-xylene, n-xylene, o-xylene, ethylidene cyclohexene and styrene, p-cymene, vinylcyclohexene, indane, indene, naphthalene, methylanthracene, anthracene, phenanthrene, and pyrene. The quantity of the extract was highest for dusts from the oven battery area, and lowest for dust from the coke sorting area.

57726

APTIC NO. 76487

Nevers, Noel de and J. Roger Morris

ROLLBACK MODELING: BASIC AND MODIFIED. J. Air Pollution Control Assoc., 25(9):943-947, Sept. 1975. 13 refs. (Presented at the Air Pollution Control Association, Annual Meeting, Chicago, Ill., June 1973, Paper 73-139.)

The basics of the rollback or proportional model technique are discussed. It is widely used in pollution control calculations and is included in the guidelines for preparing and evaluating state implementation plans. Rollback assumes that the concentration of any long-lived pollutant at any point is equal to the background concentration of that pollutant plus some linear function of the total emission rate of that pollutant in the area which influences the concentration at that point. The limitations of rollback are described.

57727

APTIC NO. 80362

Newman, L., J. Forrest, and B. Manowitz

THE APPLICATION OF AN ISOTOPIC RATIO TECHNIQUE TO A STUDY OF THE ATMOSPHERIC OXIDATION OF SULFUR DIOXIDE IN THE PLUME FROM A COAL FIRED POWER PLANT. *Atmos. Environ.*, 9(11):969-977, 1975. 12 refs.

The extent of oxidation of sulfur dioxide to sulfate in the plume of a coal fired plant has been studied by sampling with a single engine aircraft. A technique employing isotopic ratio measurements was utilized in conjunction with simultaneous concentration measurements of sulfur dioxide and sulfate. The use of sulfur hexafluoride as a conservative tracer was explored. The heterogeneous mechanism postulated in an oil fired plume study appears to pertain to the coal fired plume. However, the extent of oxidation seldom exceeded 5% and was limited by the relatively low particulate content of the coal fired plume. Evidence is presented for the apparent dropping out of sulfate from the plume. Implications pertaining to the ambient oxidation of sulfur dioxide are presented. (Author abstract)

57728

APTIC NO. 84100

Niehaus, Volker

PROBLEMS OF URBAN HYGIENE. (Probleme der Stadthygiene). Text in German. Forum Umwelthyg., 1(12):397-400, June 1975.

Some of the areas discussed concern water supply, sewage treatment, solid waste disposal, and air pollution as well as climatological research. Noise pollution with respect to air and ground traffic is still in need of further study. Development of electrically powered motors and gas driven engines is still pending since the storage of electrical energy and the spatial requirements of gas cylinders are presenting problems. As for combustion engines, there are no comparable machines. The number of pedestrian malls, parks, and recreation centers with swimming facilities is increasing and offers possibilities to lessen contact with noise and air pollution. Finally a note on significant correlations of architectural design and the incidence of certain diseases is considered.

57729

APTIC NO. 83113

Nikitin, V. S. and O. B. Levinskiy

ASSESSMENT OF THE SPECIFIC CONTRIBUTION OF EXTERNAL POLLUTANT EMISSION SOURCES TO AIR POLLUTION IN PIT MINES. (Otsenka udel'nogo znacheniya vneshnikh istochnikov vrednykh primesey v zagryaznenii atmosfery kar'erov). Text in Russian. Ugo, vol. 7:52-55, July 1975.

Theoretical investigations indicate the essential influence of the distribution of external point sources and linear sources of noxious ingredients on the leeward border of a pit mine on the level of pollution of the general atmosphere under conditions of a recirculating direct flow ventilation scheme. Consequently, the specific contribution of external sources in the pollution of the atmosphere of open mining concerns should be taken into consideration when pit mines are planned. By using the described experimental formula, independence can be obtained for evaluating external pollutants.

57730

APTIC NO. 83996

Nikolaeva, M. V., L. T. Mironova, and D. A. Vyakhirev

GAS-CHROMATOGRAPHIC ANALYSIS OF AUTOMOBILE EXHAUST GASES. (Analiz vykhlopnykh gazov avtotransporta metodom gazovoy khromatografii). Text in Russian. Gigiena i Sanit., no. 8:92, 1975.

A gas chromatograph comprising four columns, one flame-ionization detector and another thermal conductivity detector for the determination of hydrocarbons and inorganic gaseous components in automobile exhaust gases is described. The first column, filled with 0.5% PEG-1540-treated glass balls, is used to remove nitrogen dioxide and water vapor. The second column, filled with Porapac Q, is used to separate hydrocarbons from inorganic gases. A third column with molecular sieve 13Kh is used to improve the separation of oxides of nitrogen and carbon. Hydrocarbons are separated on a fourth column containing sodium hydroxide-treated alumina. The detectability amounts to 0.000001% concentration for hydrocarbons, 0.003% for nitrogen oxides, and to 0.001% for carbon oxides.

57731

APTIC NO. 79725

Norrstrom, Hans

POLLUTION CONTROL IN THE SWEDISH PULP AND PAPER INDUSTRY. *Ambio*, 4(2):80-86, 1975. 35 refs.

The environmental effects from the manufacture of pulp and paper in Sweden are reviewed. Sulfur dioxide, some hydrogen sulfide, and other malodorous compounds are emitted from sulfate mills, and SO₂ from sulfite mills. Small amounts of chlorine compounds are also emitted from the bleach plants. The solid material is mainly inorganic salts. Some gases are toxic and/or malodorous and can be detected by the human nose at very low concentrations. A main source of air pollution in a sulfate pulp mill is the recovery furnace. Increasing the amount of combustion air to the furnace above a certain value leads to a rapid decrease in the H₂S content. Because of incomplete mixing in the furnace, it is always necessary to maintain a certain excess of oxygen. The temperature in the furnace and in the smelt is of importance to the emission of H₂S. At 725 C the emissions is 5000 ppm from the smelt, while at 825-850 C, the emission is 500 ppm.

57732

APTIC NO. 79695

O'Reilly, M. P.

SUB CITY TUNNELS. *Civil Eng.*, vol. 1975:38-39, 41, Oct. 1975. 12 refs.

Various kinds of tunnels found in urban areas are discussed. Artificial ventilation of road tunnels is provided to ensure that the potentially lethal and noxious gases emitted by traffic are diluted to safe and acceptable levels. Carbon monoxide from gasoline engines is usually the main contaminant in road tunnels but there are circumstances, particularly on rising gradients, where smoke from diesel engine vehicles can be the controlling factor. Transverse and semitransverse ventilation systems are designed to ensure that the amount of CO in the tunnel atmosphere does not exceed 250 ppm in the most adverse circumstances, with somewhat higher values being acceptable near the exit portal of a longitudinally ventilated tunnel. The CO concentrations rarely exceed 100 ppm in Britain during normal working. Short circuiting between portals of paired tunnels must be minimized, especially when the longitudinal method of ventilation is being used. Care also has to be exercised if portals are located near dwellings or work places and operators need to ensure that the exposure of tunnel staff is within acceptable limits. Noise during tunneling and tunnel settlement is also discussed.

57733

APTIC NO. 79991

Obamatsu, H., T. Kikuchi, and T. Goto

ON THE ANALYTICAL RESULTS OF CHARACTERISTICS OF THE UNKNOWN ORIGIN FALL-OUT IN TAGASHIRO CITY. (Tagashiro shi ni mirareta seiin fumei kokabutsu no seijo bunseki kekka ni tsuite). Text in Japanese. Miyagi-ken Kogai Gijutsu Senta Hokoku (Miyagi Prefect. Pollut. Contr. Tech. Center Rep.), no. 3:18, 1975.

An analysis of deposited material observed in Tagashiro city is described, and its suspected source is considered. Paste-like, brown colored fall-out adhered to the roofs of buildings and cars in circular spots 3 to 4 mm in diameter, suggesting that the material was a liquid when it adhered. Infrared absorption analysis indicated C-H stretching, N-H stretching, and C-O stretching, which is similar to the IR spectra of polypeptides and proteins. The presences of 49.69% carbon, 7.52% hydrogen, and 9.85% nitrogen was confirmed. The presence of 17.5% protein in the fall-out was detected by the Lowry-Folin method. Hydrolysis of the fall-out was done with 6N hydrochloric acid and analysis was by ultraviolet absorption, thin layer chromatography, and auto-analysis of amino acids. The peak UV absorption was observed at 275 nm, which is the typical absorption peak of proteins and coincides with the absorption peak of amino acids containing an aromatic ring. The TLC indicated the presence of at least 10 different amino acids. The auto-analysis for amino acids confirmed 17 amino

acids such as glycine, alanine, valine, and oxyproline. Since oxyproline is an amino acid found only in collagen, the detection of oxyproline in the fall-out was helpful in identifying the source. There is a feed manufacturing plant in the city, and one of its raw materials was suspected. Analysis of the raw materials showed analytical results similar to those obtained from the fall-out.

57734

APTIC NO. 76392

Oelert, H. H., H. Siegert, and J. Zajontz

EMISSION OF INDIVIDUAL HYDROCARBONS BY SPARK-IGNITION ENGINES. (*Abgasemission individueller Kohlenwasserstoffe aus Ottomotoren*). Text in German. Chem. Ing. Tech., 47(17):725, Sept. 1975. 2 refs. (Presented at the Dechema Colloquium, 221st, Frankfurt/M., West Germany, April 10, 1975.)

The relative hydrocarbon emission, expressed as the percentage ratio of a specific hydrocarbon exhausted/unit of time to the input of this substance in the fuel, was studied in spark-ignition exhaust as a function of the operating conditions and the fuel composition. The emission of all saturated hydrocarbons and olefins was found to decrease with increasing engine speed due to the predominance of the temperature effect. Alkyl-benzenes with three or more aliphatic carbon atoms showed a similar behavior. Benzene and toluene in the exhaust gas are formed mainly through the dealkylation of higher aromatics. The relative emission decreases with increasing number of carbon atoms for homologous hydrocarbons under steady operating conditions, and the relative emission shows a sharp increase for olefins due to partial conversion to lower olefins. With the carbon atom number constant, the relative emission is highest for aromatic hydrocarbons.

57735

APTIC NO. 83359

Oelert, H. H., H. Siegert, and J. Zajontz

EXHAUST GAS EMISSIONS OF INDIVIDUAL HYDROCARBONS FROM OTTO ENGINES. (*Abgasemission individueller Kohlenwasserstoffe aus Ottomotoren*). Text in German. Chem.-Ing.-Tech., 47(17):725, 1975. 2 refs. (The full-length text can be obtained from: Verlag Chemie GmbH, Weinheim, Postfach 1260, West Germany.)

Individual hydrocarbons in combustion exhausts were analyzed by a multistage gas chromatographic method, in which the hydrocarbons were divided into chemical groupings as saturates, the olefins, and aromatics, which were then subdivided. The analysis was carried out on an automobile fixed to a roll-proof stand under different stationary driving conditions. The hydrocarbons were measured by means of an emission standard E, defined as a percentage of the quotient of the quantity of a hydrocarbon emitted with the exhaust in a given unit of time to the quantity of the substance put into the fuel. The effect of the motor parameters air and fuel quantity, rotation rate, and effective average pressure on the emission standards of the various hydrocarbons was studied.

57736

APTIC NO. 82190

Ogakari, R.

NON-ADDITION OF LEAD INTO AUTOMOBILE GASOLINE. (*Jidosha gasorin no muenka*). Text in Japanese. Nisseki Rebyu (Nisseki Tech. Rev.), 17(2):4-12, 1975. 12 refs.

Since Feb. 1, 1975, ordinary gasoline in Japan has not contained lead. It is estimated that in 1973, 3000 t of lead were consumed in Japan. Since Feb. 1 all the automobiles driven in Japan have been classified into 4 kinds, each bearing the sticker denoting its own class: those using no-lead gasoline, mixed gasoline (about 1/3 of the gasoline containing lead), leaded gasoline for use on high speed roads or mountainous roads, and leaded gasoline. Japanese Industrial Standard K2202-1970 is for low lead gasoline, and preparations are being made to revise this JIS standard to include new no-lead

gasoline. There are many closely related problems with automobile gasolines. Additives to clean gasoline are in use in Europe and America. The President D model of the Nissan Automobile Co., marketed since April 1975, is equipped with an oxidation catalyst. Special nozzles to protect catalyst cars from being accidentally fueled with leaded gasoline are needed.

57737

APTIC NO. 82356

Oishi, Shoji, Toru Ishitani, and Kazushige Imagami

CONSTITUENT ANALYSIS OF THE DUST USING ION-MICROANALYZER. (*Ion maikuroanaraiza (IMA) ni yoru funjin no sosei bunseki ni kansuru kenkyu* (V. Cr)). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):340, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 84.)

The determination of vanadium and chromium in a dust sample collected from a sintering furnace was done with an ion-microanalyzer. The sample was collected by an electrostatic precipitator mixed with graphite powder, and compressed with 10 ton pressure to make a dust pellet for the ion intensity of which was measured by the ion-microanalyzer; the quantitation was made using the Saha-Eggert equation. The three samples analyzed indicated greater deviation from the certified chromium and vanadium contents in the dust samples, and the deviation from the certified contents ranged from a factor of 0.5 to a factor of 3, indicating the need for a correction term in the Saha-Eggert equation.

57738

APTIC NO. 82027

Owen, Hartley

CONVERSION OF HYDROCARBONS. (*Mobile Oil Corp.*, New York) U. S. Pat. 3,907,663. 7p., Sept. 23, 1975. 5 refs. (Appl. Oct. 1, 1973, 10 claims.)

A catalytic method for converting relatively high and low boiling hydrocarbons to gasoline boiling range materials is described. A dual reactor system is used wherein a crystalline zeolite cracking catalyst of the X or Y faujasite variety combined with regenerated ZSM-5 type zeolite is employed in one reaction zone while only fresh ZSM-5 crystalline zeolite catalyst is employed in a second reaction zone. Each reaction zone performs in coordination with the other, making a contribution to the overall production of high yields of more desirable hydrocarbon products.

57739

APTIC NO. 79771

Paciga, John J., T. Michael Roberts, and Robert E. Jervis

PARTICLE SIZE DISTRIBUTIONS OF LEAD, BROMINE, AND CHLORINE IN URBAN-INDUSTRIAL AEROSOLS. Environ. Sci. Technol., 9(13):1141-1144, Dec. 1975. 18 refs.

A high volume Andersen sampler was used to measure particle size distributions for atmospheric lead, bromine, and chlorine at urban control sites and near secondary Pb refineries in Toronto, Ontario. Bromine and Cl are measured by instrumental neutron activation analysis, while Pb is determined both by absorption spectrophotometry and by instrumental photon activation analysis. The Pb aerosol near roadsides is predominantly submicrometer in size, whereas elevated Pb concentrations in the vicinity of the refineries are attributed mainly to increases in Pb associated with larger particles which settle more rapidly. The strong correlation between Pb and Br from automobile emissions allows an indirect estimate of nonautomotive Pb in the atmosphere near the refineries. Chlorine, although also associated with automobile emissions, is derived from several additional sources. The localized contamination of residential areas, which results from refinery emissions, emphasizes the importance of particle size considerations in establishing air quality standards. (Author abstract modified)

57740

APTIC NO. 84239

Pajean, G., G. Delhopital, and M. Doumeng

APPLICATION OF GAS CHROMATOGRAPHY TO THE STUDY OF THE DECOMPOSITION OF BATCHES IN GLASS-MAKING. (*Application de la chromatographie en phase gazeuse a l'etude de la decomposition des melanges vitrifiables*). Text in French. *Verres Refract.*, 29(6):231-235, Nov.-Dec. 1975. 7 refs.

Three mixtures containing various primary materials used to make a champagne tinted glass were analyzed by gas chromatography: mixture A had a typical composition of sand, sodium carbonate, slag, limestone, calcium sulfate, chromite, and nickel oxide; mixture B had the same composition as A at a finer granulometry; mixture C had the same composition as A except for the substitution of slag for nepheline. A significant carbon dioxide emission was observed around 800 C when the vitrifiable mixture decomposed and fused. Carbon monoxide appeared simultaneously with CO₂; its formation was the result of the reduction of CO₂. Sulfur dioxide and oxygen began to appear at 1000 C when refining of the glass began. With mixture C, both gases were the products of a simple decomposition of sulfates. With mixtures A and B, SO₂ emissions were greater and began earlier; however, O₂ appeared only at the end of the decomposition and in small quantities. The comparison between the standard A mixture and the finely ground B mixture, show a significant difference in CO₂ emissions. The slower rate between 760 and 820 C was less clearly marked in mixture B, indicating a greater reactivity of the mixture in a solid state.

57741

APTIC NO. 82744

Paley, Louis R. and Richard J. Powals

ASSESSMENT OF THE FUGITIVE PARTICULATE EMISSIONS ESCAPING FROM A COKE SIDE SHED.

Preprint, Environmental Protection Agency, Washington, D. C., Technical Support Branch and Clayton Environmental Consultants, Inc., Southfield, Mich., 32p., 1975. 4 refs. (Presented at the Environmental Sensing and Assessment Conference, Las Vegas, Nev., Sept. 14-19, 1975.)

The magnitude of fugitive particulate emissions escaping from the capture device (shed) of a coke battery was estimated. Visible emission attenuation coefficients (derived from opacity observations) were used in conjunction with particulate and velocity samples taken in the fugitive plumes to estimate the magnitude of the shed's particulate leaks and the capture efficiency of the coke side shed. The fugitive emission rate was estimated to about 15% of the total coke side emissions, and the shed's capture efficiency was about 85%. (Author abstract modified)

57742

APTIC NO. 80146

Patterson, Robert M.

TRAFFIC FLOW AND AIR QUALITY. *Traffic Eng.*, 45(11):14-17, Nov. 1975. 12 refs.

Situations in which the goals of traffic flow and air pollution control engineers are at variance are discussed. They include traffic signals at the isolated intersection and traffic signal settings. An additional example applies to the setting of signal progressions for unequal flows, where modeling studies indicate that least emissions occur when the total bandwidth is given to the direction of much heavier flow instead of being apportioned according to relative volumes. It would be cost effective if computer controlled network signalization systems currently coming on line are designed to include air pollution considerations.

57743

APTIC NO. 82128

Paul, Herman L., Jr.

ROTARY ENERGY CONVERTER. (Assignee not given.) U. S. Pat. 3,890,941. 11p., June 24, 1975. 8 refs. (Appl. July 15, 1974, 5 claims.)

A rotary energy converter that is capable of high or low speed operation as an internal or external combustion engine, a compressor, or an expander is described. When the energy converter is operated as an internal combustion engine, it produces an exhaust containing a minimum of atmospheric pollutants. The basic configuration consists of a stationary housing within which is rotatably mounted a disc-like primary circular rotor having a parallel-sided chamber symmetrically disposed with respect to its axis of rotation and a secondary circular rotor rotatable within the parallel sides of the chamber of the primary rotor and eccentrically fixed to a shaft that is mounted within the housing for rotation about an axis that is disposed in parallel offset relation to that of the primary rotor. The relation between the diameter of the secondary rotor within the parallel sides of the chamber of the primary rotor and the distance between the axes of the primary rotor and the shaft is such that for each revolution of the primary rotor with respect to the housing two revolutions of the shaft occur. Due to the relative motions between the primary and secondary rotors there is only a single relative revolution between the primary and secondary rotors. The housing and opposite ends of the primary rotor chamber are ported for intake and discharge. The basic configuration may be arranged in multiples for operation with respect to a single shaft common to all secondary rotors. (Author abstract modified)

57744

APTIC NO. 82469

Pereira, Rodrigues and M. Aaron Benjaminson

BROADCAST OF MICROBIAL AEROSOLS BY STACKS OF SEWAGE TREATMENT PLANTS AND EFFECTS OF OZONATION ON BACTERIA IN THE GASEOUS EFFLUENT. *Public Health Rept. U. S.*, 90(3):208-212, May-June 1975. 23 refs.

The microbiological output of a sewage treatment plant in New York City was monitored. Samples of the gaseous effluent were collected inside the aeration building, inside the stack, 300 m upwind, and 300 m downwind. The potential pathogens *Mycobacterium*, *Klebsiella*, and *Streptococcus* were identified. The disinfecting power of ozone, which is generally used for odor control, was tested. No significant differences in general bacterial counts were detected at different levels of O₃ production. In the air, O₃ was an ineffective bactericidal agent. (Author summary modified)

57745

APTIC NO. 83112

Pevnyy, N. I., G. S. Saakyants, Y. I. Tseluyko, E. M.

Nekrich, and N. N. Kuvaldina

PREVENTION OF AIR POLLUTION DUE TO NITROGEN OXIDES IN FERROUS METALLURGY. (*Zashchita vozdušnogo basseyna ot zagryazneniya okislami azota iz otkhodyashchikh gazov chernoy metallurgii*). Text in Russian. *Stal.*, vol. 8:762-764, 1975. 13 refs.

The conditions of the formation of nitrogen oxides during fuel oil combustion in heating and power plant boiler units were studied under laboratory conditions using typical units. Among operating factors, only air excess and load had a significant effect on nitrogen dioxide formation. The findings indicated that under equal conditions the increase in a single yield of the burners causes an increase in the amount of nitrogen oxides being formed. The air sucked into the furnace not only dilutes the flue gases but also participates actively in the burning up of fuel oil as well as in the formation of some additional NO₂. The results of sulfur trioxide measurement showed an increase in SO₃ with air excess and with load.

57746

APTIC NO. 84195

Pisters, H.

METHODS, INNOVATIONS, AND OPERATIONAL EXPERIENCE AT THE NEW READYMIX CEMENT PLANT AT BECKUM. (*Verfahren, Innovationen und Betriebserfahrungen im neuen Readymix Zementwerk Beckum*). Text in German. *Zement-Kalk-Gips* (Wiesbaden), 28(11):459-465, 1975. 7 refs.

EMISSION SOURCES

57751

The process of a new giant cement plant is described, innovations presented, and operational experience reported. The plant was designed for the production of 1 million tons/yr or 3000 tons/day of cement and clinker. The entire operation is electrically directed from a central control station to modify gas, raw material, and water consumption. Among the new features, steel silos, for clinker storage were constructed for environmental protection. They were built of weatherproof steel appropriate for hot storage of clinker up to 350 C. Another feature is computerized automatic weighing and loading of cement at a quantity of 600 tons/hr based on self-service operation. To improve the cooling of cement clinker, countercurrent clinker cooler system was developed for the operation of a 3000 ton/day installation. It consists of a shaft housing, 4 roller grates, a discharge funnel, emptying devices and cool-air blowers as well as measuring and regulating systems. Thermal efficiency of the operation for the first 5 months of 1975 averaged 78% with the clinker placed into the cooler at about 1450 C. Depending on the granulation of the calcined clinker, the efficiency was 76-83%. Air demand was 1-1.1 N cu m/kg of clinker. Power consumption averaged about 10 kW hr/ton. After a production of 910,000 ton of clinkers, the lining of circular sectors located above the grates was replaced at a cost of \$0.03/ton. The cost for the collar of the fluidized bed-zone was kept at 1.5 cents/ton. Attrition of roll bodies at a suitable casting quality did not exceed \$1.00/ton in 1974. The plant production per worker was 6950 tons/yr, specific thermal consumption 755 kcal/kg of clinker, and power consumption was 85 KW hr/tons of cement. The invested capital was only \$19,000,000 adding to the high degree of rentability of the plant.

57747

APTIC NO. 76149

Putnam, A. A., E. L. Kropp, and R. E. Barrett

EVALUATION OF NATIONAL BOILER INVENTORY (FINAL REPORT). Battelle Memorial Inst., Columbus, Ohio, Columbus Labs., Environmental Protection Agency Contract 68-02-1223, Program Element 1AB013, ROAP 21ADE-010, Task 31, Rept. EPA-600/2-75-067, 71p., Oct. 1975. 15 refs.

A compilation of residential, commercial, industrial, and utility boiler inventory data for the Continental United States is presented. Primary sources include: the National Emissions Data Bank, American Boiler Manufacturers Association boiler sales data, and reports to the Environmental Protection Agency. The results are presented in terms of the following: cumulative boiler installed capacity and cumulative actual boiler use plotted against boiler size; cumulative sulfur dioxide, nitrogen oxide, and particulate emissions plotted against boiler size; and tables of boiler number count, boiler installed capacity, boiler actual use, and emissions of SO₂, NO_x, and particulates by boiler size and fuel. (Author abstract modified)

57748

APTIC NO. 81923

Puzinauskas, V. P. and L. W. Corbett

ASPHALT HOT-MIX EMISSION STUDY. Am. Chem. Soc. Petrol. Chem. Preprints, 20(4):851-868, Sept. 1975. 12 refs. (Presented at the American Chemical Society, Division of Petroleum Chemistry, Inc., Symposium on Chemistry, Occurrence, and Measurement of Polynuclear Aromatic Hydrocarbons, Chicago, Ill., Aug. 24-29, 1975.)

An analysis of the emissions generated by eight different hot-mix processes involved in the preparation of asphalt paving mixes was performed. All gaseous and particulate emissions identified were at extremely low concentrations, some of them being no more than levels typical of urban air. Maximum concentrations of carbon monoxide, nitrogen dioxide, sulfur dioxide, hydrogen sulfide, phenol, ozone, hydrocarbons (seven to 14 carbon atoms), hydrocarbons (two to six carbon atoms), particulate matter, polynuclear aromatics, vanadium fumes, nickel, cadmium fume, and lead were 6 ppm, less than 0.1 ppm, less than 2 ppm, 1.3 ppm, less than 1 ppm, less than 0.1 ppm, 1.5 ppm, less than 1 ppm, 7.2 mg/cu m, 0.00036 mg/cu

m, 0.0001 mg/cu m, 0.00004 mg/cu m, less than 0.00005 mg/cu m, and less than 0.00005 mg/cu m, respectively. There were no significant differences in the amount or the composition of emissions from asphalts of different sources or in different hot-mix plants.

57749

APTIC NO. 82577

Radke, Lawrence F., Peter V. Hobbs, and Jeffrey L. Stith

AIRBORNE MEASUREMENTS OF GASES AND AEROSOLS FROM VOLCANIC VENTS ON MT. BAKER. Preprint, Washington Univ., Seattle, Atmospheric Sciences Dept., 14p., 1975. 7 refs.

Airborne measurements of gases and aerosols from recently activated volcanic vents on Mount Baker in Washington State were made on March 27 and June 30, 1975. The total emission rates of gaseous sulfur on these two days were estimated at 0.35 and 1.3 kg/sec, respectively. The latter rate is comparable to the largest single industrial source of sulfur in the Pacific Northwest. A significant increase in the emission of submicron aerosols was also observed between March 27 and June 30. Small aerosol particles were produced in the effluent plume, probably by gas-to-particle conversion, at a rate of about 2 times 10 to the 17/sec. However, the concentrations of cloud condensation nuclei and ice nuclei in the plume were comparatively small. Aerosols in the plume greater than about 1 micron in diameter consisted primarily of aluminum, silicon, sulfur, potassium, and calcium. Some of the aerosols which were collected in the plume on June 30 were possibly Pele's hairs which are a sign of new magmatic activity. (Author abstract modified)

57750

APTIC NO. 76114

Reding, John T. and Burchard P. Shepherd

ENERGY CONSUMPTION: FUEL UTILIZATION AND CONSERVATION IN INDUSTRY (FINAL REPORT). Dow Chemical, Freeport, Tex., Texas Div., Environmental Protection Agency Contract 68-02-1329, Program Element 1AB013, ROAP 21ADE-010, Task 14, Rept. EPA-630/2-75-032-d, 44p., Aug. 1975. 21 refs.

NTIS: PB 246888/AS

Data on fuel utilization and energy conservation for the six largest energy consuming industrial groups are presented. The industrial groups dealing with chemicals, primary metals, petroleum, paper, stone/clay/glass/concrete, and food accounted for a total annual fuel usage in the early 1970s amounting to 4569 + or - 500 times 10 to the 12th kcal. Radiation, convection, conduction, and other heat losses accounted for 410 + or - 150 times 10 to the 12th kcal/yr. The use of a wide variety of conservation approaches, including heat recovery, waste product recovery, and process modification, is estimated to reduce near term annual fuel use among these six industrial groups by 774 times 10 to the 12th kcal. (Author abstract modified)

57751

APTIC NO. 83745

Reinker, D.

EMISSION INVENTORY FOR SULFUR DIOXIDE FOR THE BASEL COUNTRYSIDE AND BASEL CITY FOR THE YEAR 1970. (Emissionskataster fuer Schwefeldioxid fuer die Kantone Basel-Landschaft und Basel-Stadt fuer das Jahr 1970). Text in German. Amt fuer Luftthygiene, Liestal (Switzerland), 19p., 1975.

Sulfur dioxide emissions in tons/year for 1970 have been tabulated for residential dwellings, trade and industry, and other buildings in the 76 municipalities of the two Basel cantons. The SO₂ calculation was made from the S content of fuel oils used, and the amounts of fuel oil known to be consumed. The highest SO₂ emission density is in Kleinbasel, where the rate is 319 tons SO₂/sq km year. Other areas of high emission are Grossbasel, Pratteln, Birsfelden, and Muttens, where SO₂ emissions are 210, 70, 34, and 35 tons SO₂/sq km year, respectively. Total SO₂ emission in the Basel City canton is 70%

larger than in the much larger Basel countryside canton. Total SO₂ emissions for the two cantons are 5778 and 3415 tons/yr, respectively, while emission densities are 161.2 and 7.98 tons SO₂/sq km yr, respectively. For comparison, SO₂ emission for all of Switzerland was 3 tons/sq km year in 1970. The SO₂ emissions per resident are 25, 17, and 21 g SO₂/person for Basel City canton, Basel countryside canton, and for all of Switzerland, respectively. In the Basel countryside canton, 7/8 of the total SO₂ emission comes from the two of the four districts, these being Arlesheim and Liestal, and the remainder in the less populated and less industrialized districts of Sissach and Waldenburg. Atmospheric SO₂ was measured at 7 stations in the Basel region and compared to the emission data in these municipalities. The correlation between the two is complex owing to differences in topography, meteorology, and the heights and velocities at which waste gases are exhausted.

57752

APTIC NO. 84103

Resplandy, R.

SPECIFIC ATMOSPHERIC POLLUTION IN VISCOSE PLANTS. (*Pollution atmosphérique spécifique des usines de viscose*). Text in French. *Pollut. Atmos. (Paris)*, 17(65):18-34, Jan.-March 1975, 103 refs.

A summary of air pollution problems of the viscose industry is presented. Although most of the case histories are from France, problems and regulations of other countries are also mentioned. The air pollutants are sulfur compounds escaping into the atmosphere, mainly hydrogen sulfide and carbon disulfide. Control of the sulfur compounds during the manufacturing processes is complicated due to the secondary side reactions, which cause the losses, mainly through the escape of the gases. Tables of allowable limits of these pollutants in air and their detection from many sources are also given. Different processes and systems to eliminate air pollution from the viscose industry are mentioned.

57753

APTIC NO. 76536

Roberts, John W., Harry A. Watters, Carl A. Mangold, and August T. Rossano

COST AND BENEFITS OF ROAD DUST CONTROL IN SEATTLE'S INDUSTRIAL VALLEY. *J. Air Pollution Control Assoc.*, 25(9):948-952, Sept. 1975, 14 refs. (Presented at the Air Pollution Control Association, Annual Meeting, 67th, Denver, Colo., June 1974, Paper 74-83.)

The impact of road dust on air quality was measured in Seattle's Duwamish Valley by obtaining dust emission factors for vehicles traveling at 10, 20, and 30 mph on gravel and dust paved roads. Each vehicle mile at 20 mph on unpaved roads contributed 7 lb of dust to the air, 1.9 lb consisting of particles smaller than 10 micron in diameter and 0.24 lb below 2 micron. Three to 8% by weight of this respirable dust was free silica, which is potentially toxic. The quantity of dust generated varied as an exponent of the speed. The concentrations of dust found in the air near a dry gravel road with an average daily traffic (ADT) of 250 reached 584 micrograms/cu m for an 8-hour work day. A 24-hour suspended particulate reading of 463 microgram/cu m total and 3.83 microgram/cu m free silica was found beside a dusty paved road with an ADT of 18,000. Nineteen miles of gravel roads and 110 miles of dusty paved roads contributed 2700 ton/yr of particulate, of which 700 tons were below 10 micron. (Author abstract modified)

57754

APTIC NO. 84392

Roberts, Kenneth J. and R. Bruce Rettig

LINKAGES BETWEEN THE ECONOMY AND THE ENVIRONMENT: AN ANALYSIS OF ECONOMIC GROWTH IN CLATSOP COUNTY, OREGON. *Oregon State Univ., Corvallis, Agriculture Experiment Station, Publication ORESU-T-74-005, Bulletin 618, 31p., May 1975, 20 refs.*

AIR POLLUTION ABSTRACTS, JUNE 1976

An economic and environmental evaluation of the impact of a proposed aluminum plant in a rural area of Oregon is presented. Linear programming is used to trace environmental consequences of alternative economic growth patterns. The increased economic activity induced by the aluminum plant's operation is expected to result in 975,982 lb of particulate emissions being generated by other sectors affected by the plant's activities. This figure represents slightly more than a 100% increase in particulate levels over those experienced in a non-aluminum economy.

57755

APTIC NO. 84367

Robinson, Elmer and Robert C. Robbins

GASEOUS ATMOSPHERIC POLLUTANTS FROM URBAN AND NATURAL SOURCES. In: *The Changing Global Environment*. S. Fred Singer (ed.), Boston, Mass., D. Reidel Publishing Co., 1975, p. 111-123, 38 refs.

Natural and anthropogenic contributions to gaseous atmospheric pollutants are compared. Natural emissions of sulfur as organic sulfur or hydrogen sulfide are about 30% greater than estimated industrial emissions of sulfur dioxide and H₂S. Sulfur dioxide is the only significant anthropogenic pollutant in the sulfur cycle, and its transformation to sulfate in the form of sulfuric acid occurs in a matter of days. Natural emission processes are responsible for the major share of atmospheric nitrogen compounds; anthropogenic nitrogen dioxide apparently plays a minor role in the nitrogen cycle. Carbon monoxide concentrations in the northern hemisphere where about 90% of the world's fuel combustion occurs are considerably higher than in the southern hemisphere. The ratio of northern to southern hemispheric average CO concentrations in the north and south Pacific is 2:1 (0.14 ppm to 0.06 ppm). Nevertheless, natural CO sources involving the ocean, the biosphere, and perhaps atmospheric chemical reactions also appear to exist.

57756

APTIC NO. 82712

Rogers, R. D.

METHYLATION OF MERCURY IN A TERRESTRIAL ENVIRONMENT. *Environmental Protection Agency, Las Vegas, Nev., Environmental Monitoring and Support Lab., Int. Conf. Heavy Metals Environ., Toronto, Canada, 1975, p. C218-C219, 1 ref. (Oct. 27-31.)*

The occurrence of methyl mercury in soils was studied. Three calcareous soils were used; loamy sand, fine sandy loam, and silty clay loam. The soils were amended with 2 ml of a solution containing 12,500 ppm mercury as mercuric nitrate, for a total addition of 25,000 microgram Hg/50 g of soil. Fifty g of soil were spread thinly and sprayed with 2 ml of the Hg solution. The amended soil was mixed and poured into a flask and incubated in the dark at 24 C. Methyl mercury analysis was performed with a gas chromatograph. All three soil types contained ppm quantities of methyl mercury after incubation. The methyl mercury content increased with increasing clay content; however, the amount in all soils decreased between the first (1 wk) and the last sampling periods (3 wk). Methyl mercury syntheses from applied ionic mercury in terrestrial systems was confirmed. Using air sampling, quantities of mercury chloride type compounds, methyl mercury (II) type compounds, elemental mercury, and dimethyl mercury were detected in the atmosphere above the fine sandy loam immediately after Hg(NO₃)₂ application. The concentration of all species in the atmosphere above soil adjusted to the concentration of 500 ppm Hg was beyond the analytical detection limits (200 ng Hg maximum). This high concentration was prevalent for several days. Elemental mercury predominated, followed by methyl mercury, ionic mercury, and dimethyl mercury, for 2 days. Apparently mercury loss from soil with time is real and is due to a transformation of Hg(NO₃)₂ into more volatile species.

EMISSION SOURCES

57762

57757

APTIC NO. 79762

Rollwage, W. A.

CONSERVATION OF ENERGY: ENERGY CONSERVATION IN CHEMICAL PLANTS. *Chem. Eng. Progr.*, 71(10):44-49, Oct. 1975. 1 ref.

Establishing an energy conservation program in chemical plants is discussed. Six types of action are required in an organization to have a successful program: goal setting and progress reporting, economic evaluation, design, routine operations and maintenance, employee education, and public relations. Energy conservation is most successful when top people are involved, there is broad participation, and the facts about energy costs and energy performance are publicized and understood. There must be a willingness and capability to evaluate new techniques and equipment in terms of basic engineering principles and today's economics. The energy conservation program of the Texas Div. of Dow Chemical U.S.A. is discussed.

57758

APTIC NO. 79251

Rote, Donald M. and Lawrence E. Wargen

A GENERALIZED AIR QUALITY ASSESSMENT MODEL FOR AIR FORCE OPERATIONS (FINAL REPORT). *Air Force Weapons Lab., Kirtland AFB, N. Mex., Proj. 19008W03, Rept. AFWL-TR-74-304, 168p., Feb. 1975. 40 refs.*

The Air Quality Assessment Model is designed to serve as a generalized model that can be used to assess the impact of air base operations on the air environment. The methodologies incorporated into the computer programs for the computation of pollutant emissions and the subsequent dispersal of these pollutants in the ambient air are discussed. Simulation of aircraft operations, temporal and spatial modeling of pollutant emissions, and dispersion models based on the Gaussian plume formulation are discussed. The program contains a short term dispersion model for hourly calculations and a climatological type model based on the Air Quality Display Model for long time average concentration calculations. (Author abstract)

57759

APTIC NO. 82426

Rubin, Alan M. and Paul S. Klianian

VISIBLE PLUME ABATEMENT WITH THE WET/DRY COOLING TOWER. *Power Eng.*, 79(3):54-57, March 1975.

A wet/dry mechanical draft cooling tower can reduce or eliminate the visible plume and problems associated with it. A full-size wet/dry test and demonstration facility was built and instrumented. Sensors were located throughout the cell so that temperatures, pressures, flows and flow patterns could be measured and recorded. Ambient conditions likewise were documented. The temperature at the entrance to the evaporative section can be controlled by increasing or decreasing the amount of water flow in the dry heat exchangers, thereby changing the exhaust conditions and the extent of plume formation. A significant reduction in plume severity may be more practical than complete elimination and highly acceptable. Visibility in a fog is a function of liquid water content and droplet size distribution. The meteorological visible range in fog is directly proportional to the mean radius of fog drops. Dividing the Houghton-Radford visibility predictions, which were based on liquid water content in a fog consisting of drops of 45 micron average diameter, by the ratio of mean drop diameters of different fogs will yield a revised curve of visibility as a function of both liquid water content and drop size. This calculation has been used to predict visibility in plumes where the drop ratio is assumed to be 4.5. Visual observations of plumes from the demonstration wet/dry tower seem to correlate with the predictions of visibility made on the modified basis. Observations under constant ambient conditions show that plume characteristics can be controlled by varying the wet/dry operational mode of the tower. Adjustments can be made quickly enough to respond to rapid ambient changes. To

minimize the environmental impact of plumes and to optimize power plant operation, a well-engineered control system is necessary.

57760

APTIC NO. 81745

Saito, Koichi and Tatsuya Saijo

ON THE TOXIC GAS INVESTIGATION AT THE STATIONARY SOURCE. (*Hasseigen ni okeru yudoku gasu no chosa*). Text in Japanese. *Ibaragi-ken Kogaigijutsu Senta Nenpo (Annu. Rept. Environ. Pollut. Res. Center Ibaragi Pref.)*, no. 7:44-48, Oct. 1975.

A survey on hydrogen fluoride, hydrochloric acid, chlorine, and sulfur oxides emissions from 8 facilities, and nitrogen oxides emissions from 29 facilities in Ibaragi Prefecture is reported. All determinations were based on the Japan Industrial Standard Method. High HF emissions were expected from glass manufacturers; however, their emissions were below the standard (at about 1.39 ppm). More than 90% desulfurization was achieved for the flue gases from cement calculation furnaces. Chlorine gas emissions were very small, reflecting the control effort made by the facilities; the highest level found was 1.8 ppm from a copper dissolution furnace. The HCl emissions depended on the type of facilities; municipal refuse incinerators had poor HCl control, and one such facility indicated 13.0 ppm HCl. The NOx emission tended to be higher for larger scale facilities. Those facilities having large boilers showed high levels of NOx emission, which suggested the necessity for thermal NOx control. The NOx level from these facilities was up to 326 ppm.

57761

APTIC NO. 83529

Santini, Danilo

DOES WATER USE RESTRICT THE LOCATION OF INDUSTRIAL AIR POLLUTERS? *Water, Air, Soil Pollut.*, 5(2):185-194, Dec. 1975. 6 refs.

Water use in industrial production is examined as a cause of geographical clustering of major air polluting industries. Most particulate and sulfur oxide emissions in the State of Illinois are by industries using more than five billion liters of water each in a year. Most industrial air pollution is emitted within urban areas which are on water bodies with high, consistent volumes of water available. Any policy directly or indirectly promoting geographic dispersal as a means of reducing air pollution concentrations and population exposure rates is effective only if at least one of two specified conditions is met. Either (1) adequate water supplies must be provided at alternative locations or (2) the elimination of water use from the production process by technological means, such as air cooling, must be possible. These conditions do not, by themselves, insure the success of such a policy. Much closer attention is needed to the relationship between air pollution and water pollution policies. (Author abstract modified)

57762

APTIC NO. 82762

Sarli, V. J., D. C. Eiler, and R. L. Marshall

EFFECTS OF OPERATING VARIABLES ON GASEOUS EMISSIONS. *Preprint, Air Pollution Control Assoc., Pittsburgh, Pa., 31p., 1975. 9 refs. (Presented at the Air Pollution Control Association Specialty Conference on Air Pollution Measurement Accuracy as It Relates to Regulation Compliance, New Orleans, La., Oct. 26-28, 1975.)*

A series of equations for determining the effect of operating conditions (pressure, temperature, air-fuel ratio, and humidity) on the emission of nitrogen oxides, carbon monoxide, and unburned hydrocarbons from an aircraft gas turbine combustor are presented. These equations can be used for prediction purposes or for the correction of observed data back to reference conditions and are verified with JT9D production engine data as well as with JT9D altitude data. The proposed correction techniques not only greatly diminish data scatter at a given power setting but also track the data at all power settings. The format of the equations is a simple model of the combustion process. (Author abstract modified)

57763

APTIC NO. 83161

Sastre Garcia, Fernando

AIR POLLUTION AND INDUSTRIAL COMBUSTION PROCESSES. (La contaminación atmosférica y la combustión industrial). Text in Spanish. An. Mec. Electr., 52(3):35-44, May-June 1975.

Air pollution resulting from exhaust gas emissions is discussed as well as the contaminants generated by certain industrial and household installations. This leads to important reflections on the toxicity of specific aerosols; carbon compounds (carbon monoxide, carbon dioxide); sulfur compounds (sulfur dioxide, sulfur trioxide, sulfuric acid); nitrogen oxides (nitric oxide, nitrogen dioxide); soot; and carbon filaments. Advantages have also been found in the combustion of a fuel oil and water emulsion with special consideration on theoretical studies regarding its chemical and physical functions and on its favorability as an air pollution control procedure. This system yields almost complete elimination of uncombustible materials, dampening the effect of fuel oil particle rupture and employing mechanical sputtering. Results were obtained with an Ignis steam boiler and a burner with maximum consumption of 170 kg/hr and were analyzed according to NFX 43003 standards.

57764

APTIC NO. 82943

Sato, Yasuhito and Isao Mizoguchi

ANALYSIS OF SUSPENDED PARTICULATE MATTER BY EDX, PART 2. (Taikichu fuyufunjin no EDX ni yoru bunseki, dia 2-ho). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):336, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 79.)

The particulate matter in automobile exhaust gas and waste gases from an incinerator, metal smelting factory, and forging factory were analyzed by the energy dispersive X-ray method. A similar analysis was made at a mountain top for comparison. The automobile exhaust gas contained 0.2 to 2 micron particles while idling, and 0.4 to 1 micron spherical particles while running. The incinerator waste gas contained 0.6 micron particulate matter, and particles larger than 10 micron could be found. The metal smelting waste gas contained 1 to 5 micron particles of indeterminate shape. The particles contained the metals smelted in the factory. The waste gas from the forging factory contained metals in the particles found in the waste gas. The atmosphere at the mountain top contained 2 to 3 micron particles of indeterminate shape, mainly silicon.

57765

APTIC NO. 84217

Sawada, T.

MEASUREMENT METHOD ON EMISSION POLLUTION POLICY CAUSED BY JET ENGINES. (Jetto enjin no haiki kogai taisaku no tameno sokuteiho). Text in Japanese. Kikai No Kenkyu (Science of Machine), 27(7):17-23, July 1975. 6 refs.

Very few reports on air pollution caused by jet planes have been made, although there have been many on noise. At Osaka International Airport, the 200-meter road which leads to a 3000-meter runway is very close to a residential area, and complaints have been made about infant nose-bleed, allegedly caused by jet engine emission. Measurements were made on a YS-11 and on a Boeing 747, which carry the Rolls Royce Dart 10 Turboprop engine and the Pratt and Whitney JT8D Turbofan engine respectively, although experiments were curtailed due to time limits and to shortage of preparatory period in 1973. The next experiments took place in 1973, using the JT3D Turbofan (for a Douglas DC-8) and JT9D Turbofan (for a Boeing 747) at Haneda, using an engine operation stand. In the latter, sampling probes could be affixed easily, but in the former, a special fixture was required, in order to fix sampling probes (8 mm inner diameter stainless pipe) to collect carbon monoxide, total hydrocarbon, nitrogen oxides, nitric oxide, sulfuric acid gas, and dust. It is important to correctly measure the instantaneous emission concentration, which is then dif-

fused. Concentration is intermittently quite high. After diluting the emission, gauges for environmental pollution were used. Dart 10 pollution indices, when revolution was 57%, were CO (g/kgfuel) 94.9, THC, 29.1, and NO, 0.68; revolution 80%: 16.8, 6.16, and 0.10 respectively; and revolution 95%: 4.86, 4.54, and 3.07. The results for JT8D differed greatly due to its different structure. From the CO value at one instant THC and NOx could be calculated using the ratio to CO at exhaust. Theoretically, it had been expected that concentration would be maximum when wind velocity was less than 1 m/sec, but actually, concentration is highest when it was 3-5 m/sec.

57766

APTIC NO. 76576

Scharpenseel, H. W. and H. Beckmann

HEAVY METAL INVESTIGATIONS ON TERRESTRIAL, HYDROMORPHOUS AND SUBHYDRIC SOILS FROM COUNTRY AND TOWN AREAS NEAR TO INDUSTRIAL REGIONS. (Schwermetalluntersuchungen an terrestrischen, hydromorphen und subhydriken Böden aus ländlichen sowie stadt- und industrienahen Bereichen). Text in German. Landwirtsch. Forsch., 28(2):128-134, 1975. 4 refs.

A large number of terrestrial, hydromorphous, and subhydic soils from country and town areas near to and removed from industrial regions were analyzed for heavy metals (lead, cadmium, cobalt, copper, zinc, iron, and manganese). Samples from the center of Bonn had a very high lead content, and very slight increased concentration of other elements. Terrestrial soils near the Rhine-Westphalia industrial region showed increased values for lead of only about 50 ppm, and no significant differences from other terrestrial soils with respect to the other heavy metals. The clay content of the gley in the accumulation layers was markedly lower than that of the terrestrial vertisoles. Because of its higher concentration of humus, which seems to be important for combination with heavy metals, all heavy metal concentrations seemed to be higher in the gley. Gytja samples from areas removed from towns and industry were above the heavy metal content of terrestrial samples from similar areas. Gytja material from layers near towns and industry showed much higher levels of heavy metals. The Haltener Stausee, north of the industrial area, showed no clearly enhanced area of heavy metal concentration; the maximum level still lay in the fossil Bhs horizon of the spodosol formed before the submersion.

57767

APTIC NO. 76115

Schrecker, Gunter O., Ronald O. Webb, David A. Rutherford, and Frederick M. Shofner

DRIFT DATA ACQUIRED ON MECHANICAL SALT WATER COOLING DEVICES (FINAL REPORT). Environmental Systems Corp., Knoxville, Tenn., Environmental Protection Agency Contract 68-02-1365, Program Element 1AB015, ROAP 21ARW-002, Rept. EPA-650/2-75-060, 541p., July 1975. 25 refs.

NTIS: PB 246800/AS

Test data from drift characterization and airborne salt monitoring studies conducted on and around a single-cell, mechanical-draft salt-water cooling tower and two spray modules at Turkey Point, Florida are presented. Source measurements of drift droplet size distributions and mineral mass emissions were conducted for both devices during the winter and for the tower alone during the summer. Cooling tower drift droplet measurements yielded a drift emission fraction of 0.00027% of the water flow rate of 1260 kg/sec, and a droplet mass median diameter of 120 micron. The average mineral mass emission rate was 0.00083% of the minerals circulating as solute in the cooling water. Droplet size spectra and mineral mass fluxes of the spray module drift emissions were measured up to a height of 11 m above water level (below which the bulk of the drift was observed) and downwind to a distance of 88 m. The measured droplet diameters ranged between 10 and 300 micron.

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APTIC NO. 76519

Schrodt, J. Thomas, Glenn B. Hilton, and Charles A. Rogge
HIGH-TEMPERATURE DESULFURIZATION OF LOW-CV FUEL GAS. *Fuel*, 54(4):269-272, Oct. 1975. 14 refs.
Experimental results on the desulfurization of synthesized low CV fuel gas using gasifier coal ash as the sorbent are presented. Oxides of iron in the ash reacted with the hydrogen sulfide, and ferrous and ferric sulfides were formed. Fixed beds of ash, held at 1000 K, removed 99% of the hydrogen sulfide at a concentration of 1.25% and a throughput of 2000/hr. Increasing temperature, pressure, sulfide concentration, and space velocity increased the sorption capacity of the ash markedly. Results were consistent with diffusion control from laminar flow. Spent ash was regenerated by passing air through the beds, when sulfur dioxide was evolved and ferric oxide reformed. Potentials for other chemical reactions were examined by chemical equilibrium; gaseous hydrogen, carbon dioxide, carbon monoxide, and water reacted during desulfurization and their concentrations reached equilibrium. Gasifier coal ashes having significant iron content are suitable sorbents for high temperature desulfurization from synthetic low CV fuel gases derived from coal. (Author abstract)

57769

APTIC NO. 82401

Schwanecke, R.

CONSIDERATION OF AIR POLLUTION FROM LEAKAGE IN PLANTS OF THE MINERAL OIL INDUSTRY WITH RESPECT TO EMISSION REGULATIONS IN THE FEDERAL IMMISSION PROTECTION ACT. (Berücksichtigung der Luftverunreinigungen von Leckagen bei Anlagen der Mineralölindustrie im Rahmen der Emissionserklärung nach dem Bundesimmissionsschutzgesetz). Text in German. *Gesundh. Ingr.*, 96(10):273-279, 1975. 8 refs. (Presented at the 3rd Symposium on Branch Specific Emissions, Emissions by Oil Refineries and Petrochemical Plants. Bayerisches Landesamt fuer Umweltschutz, Munich, Federal Republic of Germany, March 20-21, 1975.)

Problems of air pollution due to leakage in the mineral oil industry are discussed. Hydrocarbon vapors are emitted through gaskets, seals, valves, and from storage tanks. The leakage rate of flat gasket rings was measured between 0.1 and 10 mg/sec m. The leakage rate is believed to decrease with aging of the gasket material. Packing glands are generally used for shafts, but compressors and pumps, especially those operating under high pressure, require slide ring packings or packings with sealing oil as conventional labyrinth packings have high leakage rates for volatile hydrocarbons. Emissions from safety valves can be reduced by the use of a closed waste gas collecting system. Evaporation losses from storage tanks can be substantially reduced by the use of tanks with floating roofs.

57770

APTIC NO. 83665

Schwieger, Robert G.

FIND SOX AND NOX EMISSION RATES QUICKLY. *Power*, 119(4):21-22, April 1975.

Methods of finding sulfur oxides and nitrogen oxides emission rates quickly are presented. Air pollution regulations may specify allowable emissions of NOx and SOx in 1/million Btu, lb/hr, or ppm. They usually require correction of NOx and SOx values to a standard concentration of excess oxygen in the flue gas. Since virtually all measuring instruments are calibrated in ppm, certain formulas generally are applied to determine whether or not the emission limits are being exceeded. Two nomograms are provided which can be used in place of the equations to determine if emissions are within applicable limits.

57771

APTIC NO. 83716

Seefeldt, K. F. and H. Waldmann

PROBLEMS OF LIMITED CAPACITY WITH FOSSIL FUEL FIRED LARGE STEAM GENERATORS.

(Grenzleistungsprobleme bei fossil gefeuerten Grossdampf-ferzeugern). Text in German. *VGB Kraftwerkstechnik*, 55(9):567-574, 1975. 3 refs.

Certain areas for delineating maximum per-unit output of steam generators for firing by oil, bituminous coal, and brown coal are discussed with respect to regenerative air heaters, electrostatic dedusters, axial blowers and coal dust mills. The construction and equipping of steam generators are studied with special consideration of boiler capacity per unit. Suggestions are given for handling problems with vertical pipe systems, single-induction circulation, heating surfaces and vibrations in the development of specific production programs for increasing capacity.

57772

APTIC NO. 82470

Shamsuddin, A. K. M., N. K. Patnaik, and G. S. Marwaha

AIRBORNE DUST SURVEY IN AN INDIAN COAL MINE. *J. Mines, Metals, Fuels*, 23(4):163, 166-170, April 1975. 5 refs.

An airborne dust survey was made in a fully mechanized Indian coal mine. The airborne dust concentrations for the five working shifts at the solid blasting face were 3.74, 2.86, 3.48, 3.90, and 3.08 mg/cu m. The airborne dust concentrations on five different days at the shearer face were 1.21, 1.57, 4.55, 5.25, and 4.9 mg/cu m. The conditions were well within the approved limit of dustiness for British mines (8 mg/cu m). During drilling operations, the average dust concentration was 7.7 mg/cu m. The average airborne dust concentration during blasting was 9.0 mg/cu m; 8.0 mg cu m during shearing.

57773

APTIC NO. 76363

Sheard, George F.

ENERGY UTILISATION IN THE GLASSHOUSE INDUSTRY. *J. Sci. Food Agr.*, 26(8):1071-1076, Aug. 1975. 9 refs. (Presented at the Symposium on Chemical and Mechanical Energy Utilisation in Agriculture, Oct. 24, 1974.)

Energy utilization in the greenhouse industry and ways of increasing efficiency are discussed. Greenhouse heating uses 35% or 900,000 tons of fossil fuel annually. Boilers used on greenhouse holdings can operate at thermal efficiencies of 80-85% with an overall system efficiency of at least 70%. Heat losses from greenhouses are high compared with other buildings due to the light-transmitting envelope, but can be reduced by good maintenance, use of windbreaks, and the use of insulating covers drawn over the crop at night. Double skinning by lining with clear plastic film offers attractive fuel savings, but light loss and crop reduction results in a net monetary loss. Reduction of temperature to save fuel usually results in a loss of crop and income which greatly exceeds the fuel saving. The use of light modulated temperature controllers offers promise of increasing the output from a given fuel input. The use of waste heat from electricity generation and industrial processes is unlikely to give any benefit in the near future. (Author abstract)

57774

APTIC NO. 80111

Shikada, Y., T. Funazukuri, and K. Tazetono

CONTINUOUS MEASUREMENT OF HYDROGEN CHLORIDE AT INCINERATION PLANT. (Seiso koto ni okeru enka-suiso no renzoku sokutei ni tsuite). Text in Japanese. *Toshi to Haikibutsu (J. Solid Waste)*, 5(10):24-32, 1975.

For the continuous measurement of hydrogen chloride in flue gas from a refuse incinerator, an HCl analyzer based on the solution conductimetric determination method (JIS-K-0107) was modified and tested. Descriptions of manual analysis methods and measurement data obtained at an incineration plant are given. Descriptions of continuous analysis procedure by the solution conductimetric method, the structure of the HCl analyzer, and specifications are also given with data from a performance test. The performance test results were com-

pared with those obtained by manual analysis for the evaluation of reliability. The reliability was sufficient for practical application. Using the modified HCl analyzer, relationships between HCl concentration and combustion conditions (oxygen concentration, air ratio, and furnace temperature) were investigated.

57775

APTIC NO. 73366

Shinpo, Genji

DIFFUSION OF PARTICULATES IN ENVIRONMENT. (Funjin no kankyo-chu no kakusan). Text in Japanese. Kagaku Kojo (Chem. Factory), 19(3):58-59, March 1975.

The diversity of emission sources of particulates, which started with point sources such as fly ash from coal furnaces and more complex blast furnaces and electric furnaces and has become even more complex now including the emission from the storage and transportation of raw materials is discussed with case examples of a steel mill and coke factory. Fibrous particulate, particularly asbestos which causes asbestos lung disease, is not only a problem for asbestos miners and asbestos factory workers but also the general public due to the atmospheric dispersion of asbestos fibers from equipment such as the clutch facing and brake plates of automobiles. Particulate behavior in the atmosphere is reviewed with reference to the mechanics of aerosols by N. A. Fuchs.

57776

APTIC NO. 80142

Shirokov, Y. G., Y. S. Drugov, and N. E. Petukhova

CHEMICO-HYGIENIC ANALYSIS OF VULCANIZATION GASES. Text in Russian. Gigiena Truda i Prof. Zabolevaniya, no. 2:18-12, 1975. 12 refs.

The composition and analysis of vulcanization gases were investigated. A complex vapor-gas-aerosol composition is released during vulcanization of rubber articles manufactured from general purpose types of rubber. The composition contains over 100 organic compounds including: paraffins, 11.4%; olefins, 7.38%; naphthenes, 1.83%; aromatic hydrocarbons, 27.8%; aldehydes, 5.64%; sulfur organic compounds, 33.6%; and amines, 9.35%. Preferred analytical techniques are gas chromatography, ultimate and spectral analyses, and thermogravimetry.

57777

APTIC NO. 83147

Shishido, M.

THE ACTUAL STATE OF ENVIRONMENTAL POLLUTION DUE TO ROADS. (Dorokogai no jittai). Text in Japanese. Jurisuto (Jurist), no. 2:264-268, Dec. 1975.

Environmental pollution due to roads means the environmental pollution and nuisance due to motor vehicles which run on roads. Therefore, air pollution due to roads coincides with that due to auto exhaust as well as dusts resulting from the friction of tires on pavement. The indirect air pollution due to auto exhaust is photochemical smog. The well-known symptoms and diseases caused by the components of auto exhaust and photochemical smog are described generally.

57778

APTIC NO. 82040

Sieg, Robert P. and Robert H. Kozlowski

GASOLINE PRODUCTION. (Canadian Industries Ltd., Montreal (Quebec)) U. S. Pat. 3,903,251. 7p., Sept. 2, 1975. 8 refs. (Appl. Jan. 21, 1971, 7 claims).

A process for producing a high octane unleaded or low lead gasoline is described which is achieved with no more than trace amounts of organic acid impurities. Isobutane is oxidized in the presence of acetic acid to obtain tertiary butyl alcohol containing acetic acid. A portion of the acetic acid is separated from the tertiary butyl alcohol to obtain tertiary butyl alcohol containing residual amounts of acetic acid. The latter is contacted with an acidic ion exchange resin catalyst to catalyze the esterification reaction of residual amounts of acetic acid with tertiary butyl alcohol. The products obtained are tertiary

butyl acetate, water, and unreacted tertiary butyl alcohol. The mixture of tertiary butyl alcohol containing tertiary butyl acetate and water is blended with gasoline boiling range hydrocarbons, and water is separated from the blend to obtain a high octane gasoline. (Author abstract modified)

57779

APTIC NO. 81930

Silver, W. J., C. L. Lindeken, J. W. Meadows, E. H. Willes, and D. R. McIntyre

ENVIRONMENTAL MONITORING AT THE LAWRENCE LIVERMORE LABORATORY. 1974 ANNUAL REPORT. In: Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 2, Energy Research and Development Administration, Washington, D. C., Rept. TID-4500, UC-41, UCRL-50027-74, p. 1237-1288, 1975. 12 refs.

NTIS: ERDA-54

Environmental monitoring activities at the Lawrence Livermore Laboratory are reviewed. Monthly average airborne beryllium concentrations at the laboratory site and at sampling locations where beryllium is frequently expended in high-explosive experiments show little difference, with the concentrations being three to four orders of magnitude below the emission standard. The beryllium concentrations are accounted for by resuspension of surface soil containing naturally occurring beryllium. Airborne beryllium concentrations are generally in the range of 0.00005 micrograms/cu m, with the highest values occurring during dry dusty summers and the lowest values during the winter rainy season. Airborne radioactivity monitoring data are also presented and show an average annual gross beta activity on particulate air filters during 1974 that is about five times higher than in 1973. This increase is due almost entirely to nuclear debris added to the stratosphere by a large yield Chinese atmospheric event during 1973.

57780

APTIC NO. 84441

Singer, S. Fred

GLOBAL STRATOSPHERIC EFFECTS OF SUPERSONIC TRANSPORTS. In: The Changing Global Environment. S. Fred Singer (ed.), Boston, Mass., D. Reidel Publishing Co., 1975, p. 125-134. 29 refs.

The global stratospheric effects of supersonic transport aircraft are considered. Carbon dioxide emissions from supersonic transports appear capable of causing a slight radiative cooling of the stratosphere and greenhouse heating of the lower atmosphere, although the effects of supersonic transport CO₂ emissions appear negligible with respect to other CO₂ sources. The stratospheric particulate loading is expected to be increased as a result of the direct injection of soot and through photochemical production of particles from sulfur dioxide, nitrogen oxide, and hydrocarbon emissions generated by SSTs. On a global scale, however, the increased particulate loading as a result of SSTs is not expected to produce any significant radiative modification. An estimated annual injection of about 7.8 times 10 to the 13th g of water vapor is expected, assuming the operation of a fleet of 500 SSTs. This might increase the worldwide equilibrium mixing ratio of water by about 0.2 ppm. The effect of NO_x emissions from SSTs on the stratospheric ozone column is uncertain.

57781

APTIC NO. 81880

Smith, Malcom and William Biller

EXPANSION OF INVESTIGATION OF PASSENGER CAR REFUELING LOSSES (FINAL REPORT). Scott Environmental Technology, Inc., San Bernardino, Calif., Office of Air and Waste Management and Coordinating Research Council, Inc. Contract 68-01-0434, Rept. EPA-460/3-76-006, 124p., Sept. 1975. 9 refs.

NTIS: PB 247786

A mathematical model for estimating the total hydrocarbon losses from passenger car refueling operations in an air quality control region over a specified time period is presented. The

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model computes refueling emissions as a function of gasoline Reid vapor pressure and average underground fuel and ambient temperatures. The model requires estimates of losses due to spillage and those which are displaced from the fuel tank as vapor and entrained fuel droplets during refueling. Data on temperature conditions and refueling frequency that were obtained from a field survey are used to generalize a laboratory model and create a regional model which gives total refueling losses for a given time period as a function of average daily fuel sales in the region, average Reid vapor pressure, average hourly ambient temperature, and average daily underground tank temperature. (Author summary modified)

57782

APTIC NO. 76620

Soldano, B. A., P. Bien, and P. Kwan

AIR-BORNE ORGANO-MERCURY AND ELEMENTAL MERCURY EMISSIONS WITH EMPHASIS ON CENTRAL SEWAGE FACILITIES. *Atmos. Environ.*, 9(10):941-944, Oct. 1975. 7 refs.

Sources of airborne mercury organic compounds and elemental Hg emissions were investigated. Central sewage facilities constitute a widespread source of both types of Hg emissions. Air samples obtained in cities with populations ranging from 20,000 to 700,000 provide evidence for Hg organic and elemental Hg emissions covering a concentration range greater than 10 to the 7th power. Particulate emphasis was given to meteorological and spatial factors relative to central sewage facilities. The concentration of elemental Hg in the atmosphere falls off sharply with increasing distance from the central sewage plant. The more volatile organic forms of Hg increase (for at least several miles) with distance. The concentration maxima of the organic Hg emissions is related to population size. (Author abstract modified)

57783

APTIC NO. 75196

Souza, Anthony F.

FURTHER INVESTIGATION INTO VARIABILITY IN AIRCRAFT TURBINE ENGINE EMISSION MEASUREMENTS (FINAL REPORT). *Scott Environmental Technology, Inc., Plumsteadville, Pa., Office of Air and Waste Management Contract 68-03-0410, Rept. EPA-460/3-75-011, SET 1422 03 0275, 96p., Nov. 1975. 4 refs.*

NTIS: PB 249546/AS

Causes of variability in aircraft turbine engine emission measurements were investigated. Mass flow weighted emissions data from a modified TF-30 engine were calculated and compared to data obtained by other techniques used for calculating exhaust emission rates. Ambient concentrations of exhaust related gases in and around an engine test cell were monitored during gas turbine engine operation, and the effect of ambient concentrations on emission measurements was evaluated. Emissions data were obtained for carbon monoxide, hydrocarbons, and nitrogen oxides. Emission rates calculated before and after the correction of exhaust pollutant concentrations for inlet background concentrations revealed that significant errors in calculated emission rates are likely to occur if inlet concentrations are neglected. Also, the measurement of hydrocarbons at low levels required constant checks of sample line cleanliness to avoid having the data biased. A probe manipulator capable of interchanging and rotating three multiple hole exhaust sampling probes was designed. (Author abstract modified)

57784

APTIC NO. 73496

Stewart, Roger B. and William L. Grose

PARAMETRIC STUDIES WITH AN ATMOSPHERIC DIFFUSION MODEL THAT ASSESSES TOXIC FUEL HAZARDS DUE TO THE GROUND CLOUDS GENERATED BY ROCKET LAUNCHES (TECHNICAL NOTE). *National Aeronautics and Space Administration, Hampton, Va., Langley Research Center, Work Unit 180-72-50-01, Rept. NASA TN D-7852, L-9694, 64p., May 1975. 15 refs.*

A multilayer atmospheric diffusion model is used to assess the toxic hazard of group-level rocket launch emissions, with particular emphasis on carbon monoxide and hydrogen chloride. Almost all of the rocket-motor CO appears to be afterburned to carbon dioxide within about 30 nozzle exit-plane diameters downstream, thus reducing toxic hazards due to CO. Differences greater than three orders of magnitude exist for ground level HCl concentrations from a Titan III-E cloud, depending on what cloud geometry is assumed. Similarly different distributions of toxic gas within the clouds can produce ground level concentrations that differ by a factor of 30 at downwind distances of 100 km. Since the correct stabilized cloud geometry and gas-species distributions within the cloud are presently unknown, a particular set of values can only be assumed. The diffusion model's characterization of cloud alongwind growth for several meteorological conditions appears to be in error because of the incorrect application of previous diffusion theory. (Author conclusions modified) 73497

57785

APTIC NO. 82402

Strauss, R.

MODEL STUDIES ON THE TOLERABLE POLLUTION LOAD IN THE AREA INGOLSTADT - NEUSTADT BY SULFUR DIOXIDE. (*Modelluntersuchung ueber die Belastbarkeit des Raumes Ingolstadt-Neustadt durch Schwefeldioxid*). Text in German. *Gesundh. Ingr.*, 96(10):256-257, 1975. 5 refs. (Presented at the 3rd Symposium on Branch Specific Emissions, Emissions by Oil Refineries and Petrochemical Plants, Bayerisches Landesamt fuer Umweltschutz, Munich, Federal Republic of Germany, March 20-21, 1975.)

Sulfur dioxide concentration measurements and prognostic model investigations of the SO₂ load in the Ingolstadt-Neustadt area, Bavaria, are presented. Petroleum refineries, petrochemical plants, and power plants are the major SO₂ emission sources in this area. The hourly SO₂ emission rate is 28,500 kg/hr, and it is expected to rise to 33,000 kg/hr in the course of further industrialization and population growth. The SO₂ concentrations are monitored by an automatic network which releases an alarm whenever critical SO₂ concentrations are measured. The SO₂ dispersion measurements conducted with air aircraft revealed good agreement with the thermal lift calculated according to the Briggs formula. The model simulated results for different meteorological and dispersion conditions, and the SO₂ concentrations were calculated for Klug 4 dispersion class IV. The findings of the modeling indicate that the SO₂ concentration standards can be satisfied by limiting SO₂ to 30,000 kg/hr, which will be possible by reducing the emissions of the power plants by 20%.

57786

APTIC NO. 80126

Strusinski, Artur

POLLUTION OF ATMOSPHERIC AIR WITH CARBON MONOXIDE IN THE CITY OF WARSAW. (*Zanieczyszczenie powietrza atmosferycznego tlenkiem wegla w m. St. Warszawie*). Text in Polish. *Roczniki Panstwowego Zakladu Higi.*, 26(4):425-432, 1975. 18 refs.

Atmospheric air pollution by carbon monoxide was investigated on the streets of Warsaw. The mean concentration of CO in the atmosphere in Warsaw is 3.42 mg/cu m. The mean CO concentration in the near traffic routes is 12.19 mg/cu m. Automobiles are in the main source of atmospheric air pollution by CO in Warsaw.

57787

APTIC NO. 84163

Styrikovich, M. A.

ENERGETICS AND THE ENVIRONMENT, CONCLUSIONS OF THE 9TH MIREK CONFERENCE. (*Energetika i okruzhayushchaya sreda, k itogam raboty MIREK-IX*). Text in Russian. *Teplotnergetika*, no. 4:2-5, April 1975.

The effects of fuel and energy production on the environment are discussed. Urban and industrial air pollution was the main issue at the conference. It was estimated that the total volume of industrial and residential dust, fly ash, and soot discharges reaches 200-300 million ton/year. During the past 10-15 yr the amount of fly ash discharged has been drastically reduced. On the other hand, annual industrial emission of toxic gases has increased dramatically: 150 million ton of sulfur dioxide, 300 million ton of carbon monoxide and 50 million ton of nitrogen oxides. Available data indicate that gaseous and particulate pollutants mainly affect the areas near the discharge sources. The changes in the composition of the air pollutants since World War II are seen as the result of increased consumption of oil and petroleum products. Some countries have adopted strict regulations for particulate discharge into the air. In Japan the maximum allowable discharge from steam generators in steady-state conditions was reduced from 1.0 g/cu m to 0.05 g/cu m. To study the long-term biological effects of air pollution, it is essential that continuous observations be made of representative population groups in various industrial areas with different levels of air pollution.

57788

APTIC NO. 83264

Sueda, Yasuhiko, Isao Ito, Toshiaki Konishi, Hiroichi Yamada, Yasushi Hisagaki, and Fusaki Odawara

ON THE EXPERIMENTAL STUDIES OF LOW CONCENTRATION SO₂ MEASURING DEVICE FOR FLUE GAS. (*Endo haigas-yo teinodo SO₂ kei no shikenken:yu ni tsuite*). Text in Japanese. Kansai Denryoku K. K. Soken Hokoku (Rep. Inst. Kansai Electr. Power Co., Inc.), no. 16:187-190, Sept. 1975.

Conventional continuous sulfur dioxide meters installed at steam power plants for measuring concentrations of sulfur dioxide contained in the stack gas have a measuring range of 1000 to 3000 ppm, which is not effective for measuring concentrations under 100 ppm. For the future need of measuring lower concentrations of SO₂, the Kansai Electric Power Co., Ltd. conducted a long range continuous test to study the stability of six existing low concentration SO₂ meters with a measuring range of 0-100 ppm. The tested devices, test period and locations, and test results are summarized. The results of the tests are investigated in the following areas: requirements for the SO₂ sampler, moisture interference in the analyzing section of the device, other interfering compositions, major failures and stability of the device, and cross check by a manual analysis. The results of the tests prove that low concentration SO₂ meters are qualified for plant use.

57789

APTIC NO. 84240

Sugai, M.

A CASE OF SMOKE POLLUTION IN THE HITACHI COPPER MINE. (*Hitachi kozan engai jiken*). Text in Japanese. Hitotsubashi Ronso (Hitotsubashi Rev.), 74(3):321-340, Sept. 1975. 50 refs.

Problems of mineral poisoning from copper mines are discussed. At first the problem was taken to be one of water pollution from the mines. The withering of trees in the woods surrounding the mines and damage to agricultural crops in 4 towns and 30 villages were noticed. Damage to indigo plants and lettuce were chosen as biological indicators of air pollution due to copper refineries as early as 1915. Countermeasures against air and water pollution and compensation for the damage are historically described. Tall chimneys (155.7 m in height) were built around 1914 to reduce damage in the vicinity of the refineries; the result was an increase in damage at more remote places.

57790

APTIC NO. 75956

Surprenant, Norman F. and Mark I. Bornstein

NEW SOURCE CLASSIFICATION CODES FOR PROCESSES WHICH CAUSE HYDROCARBON AND ORGANIC EMISSIONS (FINAL REPORT). GCA Corp., Bedford, Mass., GCA/Technology Div., Office of Air and

AIR POLLUTION ABSTRACTS, JUNE 1976

Waste Management Contract 68-02-1006, Task Order 8, Rept. EPA-450/3-75-067, 22p., May 1975. 7 refs.

A new Source Classification Code for industrial processes which use surface coatings containing hydrocarbon solvents, including those used for cleaning and dilution, is presented. The list contains 92 new SCC's and includes the calculated emission factors for each. The chemical composition of the solvent is also identified along with the point source and particular industrial operation.

57791

APTIC NO. 76376

Suzuki, Gyoichi, Ryo Ando, Hideyuki Yoshikoshi, Yojiro Yamaoka, and Seishiro Nagaoka

A STUDY OF THE REDUCTION OF NO_x IN THE WASTE GAS FROM SINTER PLANT. (*Shoketsuki no haigas chu NO_x no teigen ni kansuru kenkyu*). Text in Japanese. Tetsu to Hagane (Iron Steel), 61(13):2775-2783, Oct. 1975. 21 refs.

The amount of thermal nitrogen oxides formed in a sintering process was calculated by a simulation model. The amount of thermal NO_x in waste gas was 1/1000 of that from the actual sintering process. Nitrogen oxides in waste gas originate mainly from the nitrogen in coke. The nitrogen in ore is converted to NO_x. The denitration of coke is necessary for the reduction of NO_x from a sinter plant. The rate of denitration increased with rising temperature. The nitrogen in coke decreased from 0.9% to about 0.2% by a reheating at 1800 C for 1 hr. Using this low nitrogen coke, the amount of NO_x formed during sintering can be reduced to about 30%.

57792

APTIC NO. 73428

Suzuki, Takashi and Akio Kobayashi

BLACK SOOT OF COMPRESSED AND IGNITED ENGINES. (*Asshuku chakka kikan no kokuen*). Text in Japanese. Nainen Kikan (Internal Combust. Engine), 14(2):60-71, 1975. Special Issue.

Black soots are formed by pyrolytic reactions of the fuel components which occur mainly during the diffusion combustion period for direct injection engines. The soots grow through agglomeration and coagulation and the forms and shapes of the soots depend entirely on temperature, pressure, turbulence and the geometry of flame. A swirl type combustion chamber is used in direct injection engines for control of smoke. High swirl ratio results in high soot concentration at high engine rotation speed but low soot concentration at medium and low engine rotation speed. A swirl ratio of 2.0-2.5 is usually used as the optimum ratio. Soot concentration increases with increasing load for swirl type chamber, pre-combustion chamber, and open chamber, with the increase being particularly significant for the pre-combustion chamber.

57793

APTIC NO. 82018

Sweet, Ervin J.

SMOKE SAMPLING APPARATUS. (Avco Corp., Stratford, Conn.) U. S. Pat. 3,903,727. 5p., Sept. 9, 1975. 6 refs. (Appl. Nov. 30, 1973, 5 claims).

A smoke sampling apparatus for determining the amount of particulate matter in engine exhaust is described which permits a pressure check to be taken for each sample to determine if there is system leakage. A vacuum pump continuously withdraws a portion of the exhaust through a probe inserted in the exhaust path. The sample is passed through a filter paper supported within a test block wherein the solid particles are collected on the filter paper. A bypass line is provided for sample passage during periods of nonsample testing. (Author abstract modified)

57794

APTIC NO. 76296

Szabo, Andras

THE SUGAR INDUSTRY AND ENVIRONMENTAL PROTECTION. (*A cukoripar es a kornyeztvedelem*). Text in Hungarian. Cukoripar, 28(3):94-97, May-June 1975. 24 refs.

General environmental problems encountered in the sugar industry are reviewed with special regard to the situation in Hungary. Sugar production from sugar beets is a rather energy-consuming process, which implies considerable soot, sulfur dioxide, nitrogen oxides emissions from combustion processes. As coal firing is increasingly abandoned in favor of oil or natural gas as an energy carriers, it is possible to considerably reduce all emissions except for nitrogen oxides. Flue gas desulfurization or stacks with sufficient height should be envisaged whenever it is impossible to replace coal by oil or natural gas. Dust emissions generated in drying and other processes are controlled by means of cyclones.

57795

APTIC NO. 83636

Szijj, Ferenc

ENERGETIC AND ENVIRONMENTAL RESEARCH IN THE SILICATE INDUSTRY DURING THE FIFTH 5-YEAR-PLAN. (A szilikatipari energetikai, környezet-vedelmi kutatás az ötödik ötéves terv időszakában). Text in Hungarian. *Szilikattechnika*, no. 2:28-31, 1975.

Research and development tasks to be solved in the Hungarian silicate industry in the area of energetics and environmental protection during the fifth 5-year-plan period are outlined. The expected trends in the use of the different energy carriers in the silicate industry show a considerable increase of the use of natural gas and other hydrocarbons at the expense of coal during the period ending 1980. The dust separation techniques currently employed in cement works are not sufficient. A considerable improvement can be expected from the installation of new plants adopting the dry or semi-dry technology. It will be necessary to use low-sulfur fuels to abate sulfur dioxide emissions. The Silicate Research Institute (SZIKKTI) has been assigned to conduct and coordinate research in the environmental protection areas for all branches of the industry. This task implies thorough studies on the properties of dusts and systematic emission and concentration measurements in the silicate industry.

57796

APTIC NO. 82021

Tabaczynski, Rodney J.

TWO-STAGE ROTARY COMBUSTION ENGINE.

(General Motors Corp., Detroit, Mich.) U. S. Pat. 3,903,848. 7p., Sept. 9, 1975. 2 refs. (Appl. Aug. 14, 1974, 3 claims).

A two stage rotary combustion engine designed to minimize exhaust emissions is described. A rich air-fuel mixture is supplied to the first stage of the engine; and after compression this rich charge is spark ignited, with the resulting hot combustion gases being directed by a gas transfer port into the chamber of the engine's second stage. The chambers in the second stage induct both the rich products from the exhaust of the first stage and fresh air, and this mixture is ignited by the jet of hot combustion gases from the first stage chambers.

57797

APTIC NO. 76307

Takahashi, K.

CHARACTERIZATION OF PARTICLE TYPE AIR POLLUTANTS.

(Ryushijo taiki osenbusshitsu no characterization). Text in Japanese. *Kankyo gijutsu* (Environ. Conserv. Eng.), 4(9):622-628, Sept. 1975. 40 refs.

The characteristics of particulate air pollutants are reviewed. Gaseous substances such as sulfur dioxide, nitrogen oxides, and hydrocarbons form aerosol particles when irradiated by ultraviolet light. The changes of aerosol particles with time and space are important in their characterization; the determination of the particle distribution for each chemical species is necessary. Particle distribution can be determined with high accuracy by employing sophisticated apparatus such as light scattering counters and static aerosol analyzers. Chemical analysis is usually conducted by using radioisotope analysis, X-ray fluorescence analysis, or atomic absorption. An X-ray microanalyzer also provides relevant data on composition anal-

ysis for single particles. Sample collection for chemical composition analysis is usually carried out using a cascade impactor or a centrifuge. Radioisotope analysis was conducted on 26 elements and their emission sources were identified. Radioisotope analysis on 32 elements revealed that the weight particle distribution was bi-modal, and that selenium, arsenic, and cadmium tended to form small particles and aluminum, calcium, and titanium tended to form large particles, while sodium, chlorine, potassium, vanadium, and iron formed both small and large particles.

57798

APTIC NO. 84542

Tanaka, F. and M. Nakao

ON THE RESULTS OF A SURVEY OF FLUORIDES IN THE AIR OF THE WESTERN PART OF SHIMANE PREFECTURE BY METHODS LTP AND DJ.

(Shimaneken Seibu chiku ni okeru LTP ho oyobi DJ ho niyoru taikichu fukkabutsu no kankyochoosa kekka ni tsuite). Text in Japanese. *Shimane Ken Eisei Kenkyusho Nenpo* (Annu. Rep. Shimane Prefect. Public Health Inst.), no. 16:61-66, 1975.

In the western part of Shimane Prefecture, there are many glazed-roof tile manufacturing factories. Around them, damage to silkworms, agricultural crops, and plants sometimes occurs. The fluorine concentration of air was determined by the LTP and DJ methods. A high concentration was found (more than 100 microgram/sq dm/month (LTP)) near a single factory and in the area of tile manufacturers. There was a correlation between values obtained by the LTP and DJ methods.

57799

APTIC NO. 83908

Tandon, T. N.

AIR POLLUTION AND THE ENVIRONMENT. *Indian and Eastern Engr. (Bombay)*, 117(8):365-369, Aug. 1975. 18 refs.

The environment has reached the stage where nature cannot cleanse itself. Rapid industrialization and urbanization are the two main factors which have caused air pollution to reach an objectionable level. Statistical data indicate that the major sources of air pollution are the internal combustion engine and waste from industry. The pollutants emitted in sufficient quantities to give rise to concern are carbon monoxide, carbon dioxide, oxides of sulfur, oxides of nitrogen, hydrocarbons, and particulates. Many gases regarded as pollutants are produced by natural processes, in some cases in quantities far exceeding those arising from the sources normally regarded as polluting. However, the natural emissions are distributed all over the world and thus do not normally cause high local concentrations. The effects of carbon monoxide, carbon dioxide, oxides of sulfur, photochemical oxidant, hydrocarbons, and particulates on human health are discussed. Effects of air pollution on animals, plants, meteorological changes, and solar energy are also discussed. The extreme consequences of air pollution could be melting of polar ice caps thereby resulting in an increase in sea level, and excessive penetration of ultraviolet radiation in the atmosphere.

57800

APTIC NO. 84272

Tatishchev, S. V., V. E. Dymkov, and N. M. Tarasov

WASTE INCINERATOR FURNACES. (Topochnye ustroystva dlya szhiganiya otkhodov). Text in Russian. *Teplotekhnika*, no. 9:28-34, 1975. 17 refs.

Recent developments in the design of waste incinerator furnaces abroad and in the USSR are reviewed. The efficient incineration of wastes with high moisture content requires preheated combustion air and/or auxiliary firing by means of oil or natural gas. The particulate matter emission from waste incinerations must not be higher than 5-10 g/cu m.

ENVIRONMENTAL LEAD AND ITS EFFECT ON MAN: SOURCES AND PATHWAYS. Preprint, American Association for Advancement of Science, 15p., 1975. 99 refs. (Presented at the American Association for Advancement of Science, Annual Meeting, New York, Jan. 26-31, 1975.)

Lead is naturally present in the environment and most of it is found in soil. The principal source of lead in soil near houses is leaded paint in both urban and rural areas. Burning of lead antiknock in gasoline is the main source of lead in air in many areas. Rainfall is the most important method of removal of lead from the air. Snowfall and sedimentation also remove lead from air. As lead is tightly bound to soil components, sediments and soils are the major sinks for lead. Environmental lead has very little effect on animals. The major source of lead in man is the food chain. Nearly all the lead in the food chain comes from lead naturally present in the soil. Present concentrations of lead in air do not measurably increase the lead content of the edible portion of most plants. Lead in the blood of adults and lead in air correlate very poorly. Lead is a problem in some special cases, such as the ingestion of leaded paint by small children or inadvertent exposure to lead in air near an industrial point source. Generally, most studies have shown that neither the lead emitted from automobiles nor from an industrial point source has an impact on the health of man. (Author abstract modified)

Ter Haar, G. L., M. E. Griffing, M. Brandt, D. G. Oberding, and M. Kapron

METHYLCYCLOPENTADIENYL MANGANESE TRICARBONYL AS AN ANTIKNOCK: COMPOSITION AND FATE OF MANGANESE EXHAUST PRODUCTS. *J. Air Pollution Control Assoc.*, 25(8):858-860, Aug. 1975. 10 refs.

The composition and fate of manganese exhaust products resulting from the use of methylcyclopentadienyl manganese tricarbonyl (MMT) as an antiknock are discussed. The use of MMT in gasoline is not a public health hazard because of the low toxicity of manganese and because of the very low concentration of MMT that would be used in gasoline (a maximum of 0.125 g Mn/gal). If all gasoline contained 0.1 g Mn/gal, the amount of airborne Mn its exhaust would contribute to urban areas would be only 0.02-0.2 micrograms/cu m, with a median value of 0.05 micrograms/cu m. The organic component of this would be 0.000012 micrograms/cu m. (Author conclusions modified)

Terajima, Tenji

OFFENSIVE ODOR. (Akushu). Text in Japanese. Mokuzai Koryo (Wood Ind.), 30(344):508-510, Nov. 1975. 4 refs.

Offensive odors from the decomposition of lumber by microbes and the metabolic products of lumber itself are discussed. Malodor from imported lumber stored in water is causing various problems. Antiaris lumber was investigated by gas chromatography, which detected n-butyric acid and n-valeric acid as the major causes of the odor due to the fermentation of hydrocarbons in the lumber by anaerobic microbes. The existence of the odor causing microbes in the lumber was proved by a test, in which a large amount of lower aliphatic acid was found by gas chromatography. The complete control of this odor is very difficult because it is formed in the inner structure of the lumber and is hydrophilic. As much as 26 mg/100 g of fatty acid remained in a sample of antiaris lumber (7 by 60 by 300 mm) after drying treatment at 140 C for 5 hr, and 99 mg/100 g after steam treatment at 100 C for 3 hr.

Thomson, Robert D. and Harold F. York

THE RESERVE BASE OF U. S. COALS BY SULFUR CONTENT (IN TWO PARTS) 1. THE EASTERN STATES. Bureau of Mines Information Circ., no. 8680:1-537, 1975. 229 refs.

Estimates of the coal reserve based are given for the states east of the Mississippi River by county, coalbed, and rank. Bituminous and anthracite coalbeds 28 in. or more in thickness to a maximum depth of 1000 ft and lignite beds 60 in. thick or greater are considered. To evaluate the reserve by sulfur content, data from the Bureau of Mines were synthesized using a computer program. The reserve base in the Eastern States was 202.3 billion tons. Bituminous coal accounts for the greatest reserve base: 161.5 billion tons of deep minable coal, and 32.5 billion tons of strip minable coal. Virtually all of the anthracite reserve base, 7.3 billion tons, is minable by underground methods. All of the lignite, 1 billion tons, is strip minable. Sub-bituminous coal is not significant in the Eastern United States. About 14% of the bituminous coal reserve base, 26.5 billion tons, contains 1.0% or less sulfur. About 87% of the anthracite reserve base, 6.3 billion tons, is low sulfur coal. (Author abstract modified)

Tokuda, Sumio, Shiro Ohnishi, Junichi Ueda, Masakazu Takahashi, Yoichi Terai, Takeichi Hikichi, and Michio Yoshiga

METHOD OF TOTAL EMISSION CONTROL OF AIR POLLUTION FROM A VIEW OF SOURCES IN KYOTO CITY. (Haseigen kara mita kyotoshi no taiki o senbusshitsu soryo kisei hoshiki no hitsuyousei). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):408, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 152.)

The sulfur dioxide pollution in Kyoto City is described. The city's pollution is typically urban. The main pollution sources are the textile industries; there are no electric power plants or industrial complexes near the city. The estimated heavy oil consumption in the city was 400,000 kl/yr, of which 350,000 kl were used by industries for which legal pollution control is in effect. The total SO₂ emission in 1973 was 6003 ton, at a constant rate throughout the year: about 500 ton SO₂/month. Since the SO₂ control law in 1970 and similar laws after it, the City's SO₂ level has decreased every year. The yearly average SO₂ level in 1970 was about 48 ppb, and it decreased to around 28 ppb in 1974. However, SO₂ control by existing legal regulation cannot any longer achieve the environmental standards. Total emission control at individual pollution sources must be enforced, rather than control by area.

Trattner, R. B., A. J. Perna, H. S. Kimmel, and R. Birch

RESPIRABLE DUST CONTENT OF SUBWAY AIR. *Environ. Letters*, 10(3):247-252, 1975. 10 refs.

The total and respirable dust content at an underground station of the Newark City Subway System was determined during the non-heating months of June, July, and Aug. 1974. In nine out of the 14 sampling periods, the particulate level in the subways was at least twice as great as that reported for ambient Newark air. The Federal Ambient Primary Air Quality Standard for suspended particulate matter of 260 microgram/cu m collected in a 24 hr period was exceeded twice during the 3-month period. (Author abstract modified)

Truhaut, R., P. Bourbon, and J. Alary

FLUORIDE EMISSIONS FROM TREATMENT OF NATURAL PHOSPHATES IN THE PRODUCTION OF FERTILIZER. *Fluoride Quart. Repts.*, 8(1):25-33, Jan. 1975. 6 refs.

EMISSION SOURCES

57812

Emissions from a fertilizer plant manufacturing super, triple, binary MAP and DAP and NPK fertilizer are discussed. The total fluoride emission corresponds to a mean of 100 kg of fluoride/day. The levels of fluoride in the environment were determined during a period of 2 yr at four sampling points situated within a radius of about 1 km from the facility. The values obtained varied between 0 and 10 micron fluoride/cu m. The mean value was close to 2 micron/cu m in total fluoride. Dust analysis in the immediate vicinity showed that about 40% of the collected dust contained apatite derived essentially from the unloading of the minerals. This much fluoride pollution caused necrosis in plants. Fluoride ion ranging from 10 to 200 ppm was found in 50 specimens of sensitive plants. Fluoride ion emission limits are proposed for agricultural areas 1, 2, 3, 5, and 4.5 ppb for periods of 1 mo, 1 wk, 24 hr, and 12 hr, respectively.

57808

APTIC NO. 82243

Tsuiji, Shogo

ON SOOT AND DUST DETERMINATION DEVICES.

(*Baijin sokutei kiki ni tsuite*). Text in Japanese. *Nenryo Oyohi Nensho (Fuel and Combustion)*, 42(11):1009-1014, Nov. 1975.

Soot and dust formation in stacks, and continuous stack emission monitoring and sampling devices are briefly described. When coal (10-30% ash content) is used as fuel in thermal power plants, about 20% ash remains in the boiler as clinker, while 80% is emitted as fly ash. When crude oil or heavy oil C is used as fuel, total ash content of the oil (0.01-0.1 wt%) is emitted as stack dust. When oxygen concentrations are decreased to control formation of sulfur trioxide and nitric oxide, stack dust emission increases. Average particulate size of carbon dust from heavy oil combustion ranges from 10-15 micron. Addition of ammonia to control smut formation results in formation of ammonium sulfate, with particulate sizes below 5 micron. Continuous monitoring of stack dust is performed by light transmittance, light dispersion, and electrostatic methods. Light transmittance methods are used in direct stack dust sampling, within the stack. A less accurate method is the withdrawal of samples from the stack before determination. The Hitachi AN 100-2 Stack Dust Monitor is a continuous measuring and recording device for stack dust concentrations (from one to several hundred mg/N cu m), based on the determination of the light dispersion pulse of a single particle. Particle size distributions can also be determined. Reproducibility is $\pm$ or - 5%. Each unit of the device weighs less than 30 kg.

57809

APTIC NO. 80456

Tsuyuki, Tamotsu

PRESENT SITUATION AND FUTURE TOPICS CONCERNING HYDROCARBON EMISSIONS FROM STATIONARY SOURCES. (*Kotei hasseigen ni okeru HC rui haishutsu jittai to kongo no kadai*). Text in Japanese. *Netsu Kanri To Kogai (Heat Management Public Nuisance)*, 27(10):10-16, 1975.

Hydrocarbon (HC) emissions from major stationary sources were surveyed for 1973. Not included in the survey were chemical industries (excluding petrochemicals); manufacturing processes, storage and transportation facilities, for gas, steel, and electric power industries. When these emissions were ranked in order from 1 (highest photochemical reactivity) to 5 (lowest photochemical reactivity), 75% of the hydrocarbons belonged to ranks 1-3. About 50% belonged to rank 3; 17% to ranks 2-3; comparatively little to ranks 1 and 5. Total HC emissions amounted to 1,315,100 t, including 15.1% petroleum; 5.7% petrochemicals; 47.4% coatings; 8.3% printing inks; 23.5% others, including 8.9% cleaning solvents and 6.5% oil-removing solvents from metals. When regional differences in emission were tabulated, Kanto (36.1%), Kinki (19.2%), Chubu (14.3%), had most emissions. These three regions also had relatively high emission levels from solvents, and low levels from petroleum-related sources. Toluene (250,070 t, 24.4%)

and mixed solvents (21.7%) comprised nearly half of the total solvent-related emissions for 1973. Then came chlorinated solvents (11.1%), mineral spirits (8.9%), and xylene (8.6%).

57810

APTIC NO. 84681

Tsuyuki, T.

PRESENT SITUATION AND COUNTERMEASURES OF HYDROCARBON SEEN FROM PHOTOCHEMICAL AIR POLLUTION POINT OF VIEW. (*Kokagaku taiki osen kara mita tankasuiso no genjo to mondaiten*). Text in Japanese. *PPM (Japan)*, 6(8):69-78, Aug. 1975.

Work on establishing environmental standards for hydrocarbons is under way, with examination of their relationship to the generation of photochemical smog. Measures to suppress emission of hydrocarbons into the atmosphere are also being considered. Due to much emission from paint solvents and stationary sources, there are many areas still unexplored, such as varieties and concentrations of emission, forms of emission of solvents, prevention of secondary pollution, switching from solvents with high photochemical reactivity to lower reactivities, and use of paints which do not require solvents. According to a survey made by the Tokyo metropolitan government on emission of hydrocarbons by sources, 67.1% was due to automobiles and stationary sources, 29.2% from workshops which used organic solvents, and 2.5% from oil tank and gasoline installations. From these sources, all over Japan, more than 1,300,000 ton of hydrocarbon is emitted into the atmosphere/year, of which 1,000,000 ton is emitted as organic solvents, most of which are used for painting. About 15% of the total is accounted for as storage of petroleum products and evaporation loss from tanks and gasoline stations. Many hydrocarbons from these stationary sources are likely to be photochemically active, odorous, and harmful to health. Some local governments have established rules on allowable concentrations and emission control from tanks.

57811

APTIC NO. 76558

Vasicek, Bedrich and Vaclav Masek

NOTES ON LONG-TERM DUSTFALL MEASUREMENT IN A METALLURGICAL PLANT AND ITS IMMEDIATE VICINITY. (*Poznatky z dlouhodobého zjišťování prásného spadu v hutním podniku a v jeho blízkém okolí*). Text in Czech. *Hutnické Listy (Prague)*, 30(1):3-8, 1975. 4 refs.

In the course of 13 years, since 1961, the new Metallurgical Works in Ostrava-Kuncice, Czechoslovakia, succeeded in reducing the quantity of solid particle emissions into the atmosphere to almost one tenth of its original value. This was attained by a number of technological measures, mainly in the power plants, at the blast furnaces, in the steel works, and in the works transportation system. As part of the environmental care of the enterprise, the quantitative and qualitative studies of sedimented dust were expanded by modern analytical methods, including morphologic identification by means of the scanning electron microscope. These studies also included investigations into the absorptive properties of the dusts, their contact-catalytic influence on the breakdown of hydrogen peroxide, the processes of ionic interchange, radioactivity, particle sizes, and influence on plant life. These metallurgical dusts have a relatively good influence on the soil, resulting in somewhat better growth and larger plant roots, but if they settle on leaves, they impede the formation of chlorophyll and are thereby detrimental to the development of the plants.

57812

APTIC NO. 82376

Von Wiesenthal, Peter

METHOD FOR VAPORIZING A SENSITIVE LIQUID. (*Heat Research Corp., New York*) U. S. Pat. 3,897,194. 3p., July 29, 1975. 3 refs. (Appl. April 18, 1974, 1 claim).

A method for vaporizing sensitive liquids such as liquefied natural gas is described which is more economical and safer than prior art approaches. The liquid to be vaporized is passed

through a heat exchanger in noncontact heat exchange relationship with a heat transfer medium. The medium is heated in a tower and flows downwardly through trays or packing in direct contact with upflowing hot combustion gases. The combustion gases are preferably generated in a combustor that is separate from the tower. (Author abstract modified)

57813

APTIC NO. 76480

Wade, Willard A., III, William A. Cote, and John E. Yocom

A STUDY OF INDOOR AIR QUALITY. *J. Air Pollution Control Assoc.*, 25(9):933-939, Sept. 1975. 3 refs. (Presented at the Air Pollution Control Association, Annual Meeting, 67th, Denver, Colo., June 1974, Paper 74-50.)

Measurements of nitrogen dioxide, nitric oxide, and carbon monoxide were made inside and outside of four residence each with a gas stove used for cooking. Indoor levels of NO and NO₂ were directly related to stove use in the homes tested. These stoves often produced more NO₂ than NO. The levels of NO₂ and CO in the kitchens exceeded the air quality standards for these pollutants if such outdoor standards were to be applied to indoors and the data for the sampling periods are typical of an entire year. The half-life for NO₂ is less than 1/3 that for either NO or CO. Oxidation of NO to NO₂ does not occur to a significant degree indoors. (Author abstract modified)

57814

APTIC NO. 80220

Wangen, Lawrence E. and Lester A. Conley

AIR QUALITY ASSESSMENT MODEL APPLIED TO WASHINGTON NATIONAL AIRPORT. *Argonne National Lab., Argonne, Ill., Energy and Environmental Systems Div., Proj. AFWL 75-PO-071, 106p., March 1975. 9 refs.*

The Air Quality Assessment Model was applied to Washington National Airport to calculate hourly concentrations of carbon monoxide, total hydrocarbons, and oxides of nitrogen. Calculations for 10 days in March 1972 are compared with measured pollutant concentrations. Carbon monoxide was best for comparison purposes. The model concentrations compare reasonably well with observations at most stations. Carbon monoxide and total hydrocarbons are consistently underpredicted. There is no significant relation between calculated NO_x and measured nitrogen dioxide concentrations. As averaging times increase from 1 to 3 to 8 to 24 hours, the correlation coefficients between measured and calculated concentrations improve for CO and total hydrocarbons. The model does much better during active airport hours than during times when there are very few aircraft operations. The Air Quality Assessment Model and the Airport Vicinity Air Pollution model predict airport air quality impacts equally well. (Author abstract modified)

57815

APTIC NO. 76382

Wanner, H. U.

MICROBIAL CONTAMINATION OF AIR BY ACTIVATED SLUDGE TANKS. (*Mikrobielle Verunreinigung der Luft durch Belebtschlammbecken*). Text in German. *Zentralbl. Bakteriologie, Hygiene, Infektionskrankheiten, Abteilung B*, 161(1):46-53, 1975. 7 refs.

Measurements of the germ emissions in various activated sludge units with different ventilation systems have shown that the lowest germ density occurs with small bubble ventilation; with medium bubble and brush ventilation, rather high values were measured; the spray devices used for foam elimination had a particularly unfavorable influence. On large germ densities above the pools (50-100,000 germs/cu m), depending on the weather, between 500 and 1500 germs/cu m were measured at distances of 50 and 100 m. At 200 and 400 m, the number of germs was about the same as measured in the outside air (normally 100-500 germs/cu m). In a closed pool, considerably higher values were measured: in the immediate vicinity of the

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activated sludge unit, about 10,000-25,000 germs/cu m; in the hall, 3000-4000 germs/cu m (of which coliform bacteria were 1-2% and enterococci were 2-4%). Other pathogenicous agents besides these intestinal flora are present in the aerobiosis. In closed units, therefore, there is a greater risk of aerogenous infection; in open-air pools this danger is very slight.

57816

APTIC NO. 82746

Wasser, John H.

EMISSION CHARACTERISTICS OF SMALL GAS TURBINE ENGINES. Preprint, Environmental Protection Agency, Research Triangle Park, N. C., Combustion Research Branch, 25p., 1975. (Presented at the Stationary Source Combustion Symposium, Atlanta, Ga., Sept. 24-26, 1975.)

The emissions characteristics of a small gas turbine electrical generator package (maximum rated electrical output of 225 kW) were evaluated along with the effect of water addition on emission levels. The gas turbine engine was a constant-speed, single-shaft, simple-cycle, radial-flow machine. Water addition was accomplished by mixing water with the distillate fuel oil and injecting the resulting emulsion through the engine's normal fuel pumping system. The major air pollutants from the engine were carbon monoxide, unburned hydrocarbons, and fine particulate emissions. Carbon monoxide levels at full load were around 1500 ppm, and unburned hydrocarbon emissions at full load were 50 ppm. Total particulate levels at full load were around 2 g/kg fuel. Nitrogen oxide emissions were significant but rather dilute (10-40 ppm) in the exhaust. Water addition did not benefit the emissions situation; the CO problem became considerably worse, while the NO_x improvement was not worth the trade-off for the CO increase. Water addition neither increased nor decreased the engine's thermal efficiency. (Author conclusions modified)

57817

APTIC NO. 81870

Wayne, L. G. and M. L. McQueary

CALCULATION OF EMISSION FACTORS FOR AGRICULTURAL BURNING ACTIVITIES (FINAL REPORT). *Pacific Environmental Services, Inc., Santa Monica, Calif., Office of Air and Waste Management Contract 68-02-1004, Task 4, Rept. EPA-450/3-75-087, 69p., Nov. 1975. 28 refs.*

NTIS: PB 251555/AS

Emission factors for particulate, hydrocarbon, and carbon monoxide emissions resulting from the open burning of agricultural materials (crops, weeds, and wood waste) are presented. Data calculations, and supplemental information upon which the emission factors are based are also provided. Proposed revisions to the emission factors for agricultural burning activities given in Sections 2.4 and 6.12 of AP-42, Compilations of Air Pollutant Emission Factors, are presented.

57818

APTIC NO. 76482

Weddendorf, William K.

A COMPUTER PROGRAM FOR PROCESSING STACK SAMPLING DATA. *J. Air Pollution Control Assoc.*, 25(9):955-956, Sept. 1975. 1 ref.

A computer program for processing stack sampling data was developed. The computations of Methods 2, 3, 4, and 5 of the Federal register were incorporated into a program designed for use with a time-sharing computer by an engineer or technician. No knowledge of typing, programming, computer language or operation is required, and only about 15 min of instruction is necessary to operate a typical time sharing terminal. The user's responses are limited to one word such as yes or no, or a series of numbers.

57819

APTIC NO. 83900

Westphal, Bernhard, W. and Hans-Georg Norbisch

INCINERATOR AND POWER PLANT GOEPPINGEN. (Muehlheizkraftwerk Goepingen). Text in German. *Energie (Munich)*, 27(11):303-308, 1975.

The waste incinerator of Goepingen, West Germany, designed for a capacity of 120,000 tons/year, is described. Waste incineration takes place in a temperature range of 800-1100 C. After cooling, the flue gases are dedusted in electrostatic precipitators. The waste heat generated by the incinerator plant is used for remote heating and for electricity generation for the mains. The internal power consumption accounts for about 20% of the electricity generated.

57820

APTIC NO. 76290

Widman, Gary L.

ENVIRONMENTAL IMPACT STATEMENTS. *Federal Register*, 40(178): 42391-42393, Sept. 12, 1975.

Environmental impact statements received by the Council on Environmental Quality from September 1 through September 5, 1975 are listed. A final statement refers to the Rock Creek watershed protection, land treatment, flood prevention, and irrigation water storage and distribution in Gilliam and Morrow Counties, Oregon. Adverse impacts include increased turbidity and dust. Another final statement refers to the maintenance dredging of Double Bayou in Chambers County, Texas. Adverse impacts include objectionable odors caused by proposed land disposal operations. Another final statement refers to wastewater treatment and disposal in Orange County, California. Occasional objectionable odors will result. A draft statement deals with permanent curtailment plans for a gas company. Impacts include increased sulfur dioxide and particulates. Freeway improvement is proposed for 1.5 mi in San Jose, California. Substantial increases in air pollution would result. Expansion of an existing crossing of the Hudson River in Orange and Dutchess Counties, New York, is proposed. Adverse impacts include increased air pollution. A limited access highway is proposed near Hampton Roads, Virginia. Adverse effects include increased air pollution. Impact statements for projects having effects other than air pollution are also included.

57821

APTIC NO. 79774

Wilson, Hugh H. and Larry D. Johnson

CHARACTERIZATION OF AIR POLLUTANTS EMITTED FROM BRICK PLANT KILNS. *Am. Ceram. Soc. Bull.*, 54(11):990-991, 994, Nov. 1975. 10 refs.

The characterization of air pollutants emitted from four brick plant kilns was determined. The emissions vary considerably from plant to plant. The chemical and mineral composition of brick clays and the firing temperatures are widely different from one plant to another. The pollutant concentrations vary because of the different combustion conditions that exist among the plants. Fine particulates, fluorine, and sulfur gases are the pollutants that are most likely to require control in brick manufacturing. In the four plants studied, only sulfur dioxide values at one plant are high enough to cause possible concern as a pollution source.

57822

APTIC NO. 76594

Wilson, Lee

APPLICATION OF THE WIND EROSION EQUATION IN AIR POLLUTION SURVEYS. *J. Soil Water Conserv.*, 30(5):215-219, Sept./Oct. 1975. 13 refs.

The wind erosion equation was applied on a generalized and regional basis in several areas of New Mexico to help determine the extent of natural dust in the atmosphere. This application involved the use of wind erodibility ratings for soil associations according to texture class and assumed that rangeland vegetation has a protective effect equivalent to standing small grain stubble. Use of roughness and climate variables

followed standard U. S. Department of Agriculture procedures, but the field length variable was deleted. It was assumed that 0.3% of the calculated gross erosion contributes to the atmospheric dust load measured in urban centers. But even this amount of dust is enough to exceed air pollution standards in some urban areas. Properly used, the wind erosion equation promises to be of considerable value in helping separate naturally dusty areas from those where pollution is of immediate concern.

57823

APTIC NO. 83018

Wilson, Lee

APPLICATION OF THE WIND EROSION EQUATION IN AIR POLLUTION SURVEYS. *J. Soil and Water Conserv.*, 30(5):215-219, Sept.-Oct. 1975. 13 refs.

The application of a wind erosion equation on a generalized and regional basis in several areas of New Mexico was performed to determine the extent of natural dust in the atmosphere. The application involved the use of wind erodibility ratings for soil associations according to texture class and assumed that rangeland vegetation exerts a protective effect equivalent to standing small grain stubble. The use of roughness and climate variables followed the standard Department of Agriculture procedures, but the field length variable was deleted. The percentage of dust suspension appeared to be less than 5% in most areas of New Mexico.

57824

APTIC NO. 76065

Wimette, Harold, Rod Pilkington, and Tom Kelly

GUIDELINES FOR QUALITY ASSURANCE PROGRAMS FOR MOBILE SOURCE EMISSIONS MEASUREMENT SYSTEMS: PHASE I, LIGHT-DUTY GASOLINE-POWERED VEHICLES - QUALITY ASSURANCE GUIDELINES (FINAL REPORT). Olson Labs., Inc., Anaheim, Calif., Environmental Protection Agency Contract 68-02-1740, Program Element 1HA327, ROAP 26BGC, Rept. EPA-650/4-75-024-a, 341p., June 1975. 31 refs.

NTIS: PB 245787/AS

Quality assurance guidelines for light-duty, gasoline-powered motor vehicle emission measurements are presented. The guidelines relate to such areas as procurement control, test quality control, data validation, corrective action, standards, and calibration. Methods of performance checks and preventive maintenance are also discussed along with quality management procedures and responsibilities of the quality functions. Suggested formats for documentation of test data, inspection reports, failure reports, and other form requirements of a quality assurance program are also specified. (Author summary modified)

57825

APTIC NO. 76066

Wimette, Harold, Rod Pilkington, and Tom Kelly

GUIDELINES FOR QUALITY ASSURANCE PROGRAMS FOR MOBILE SOURCE EMISSIONS MEASUREMENT SYSTEMS: PHASE I, LIGHT-DUTY GASOLINE-POWERED VEHICLES - TEST PROCEDURES (FINAL REPORT). Olson Labs., Inc., Anaheim, Calif., Environmental Protection Agency Contract 68-02-1740, Program Element 1HA327, ROAP 26BGC, Rept. EPA-650/4-75-024-b, 317p., June 1975.

NTIS: PB 245788/AS

Test procedures for light-duty gasoline-powered mobile source emissions measurement systems are presented within the concept of a total quality assurance system. The procedures are documentation of the 1975 test requirements presently in use at the Ann Arbor facility of the Environmental Protection Agency. The test procedures are separated into nine distinct sections: gas blending, fuel analysis, and inventory; calibration; verification; correlation; maintenance; daily operation; emission testing; data validation; and program planning and quality audit. The procedures are presented in document con-

trol format and include quality assurance provisions for each part of the total testing system.

57826

APTIC NO. 81909

Wimette, Harold, Rod Pilkington, and Tom Kelly

GUIDELINES FOR QUALITY ASSURANCE PROGRAMS FOR MOBILE SOURCE EMISSIONS MEASUREMENT SYSTEMS: PHASE II, HEAVY-DUTY DIESEL ENGINES - QUALITY ASSURANCE GUIDELINES (FINAL REPORT). Olson Labs., Inc., Anaheim, Calif., Environmental Protection Agency Contract 68-02-1740, Program Element 1HA327, ROAP 26BGC, Rept. EPA-650/4-75-024-c, 355p., June 1975, 30 refs.

Guidelines for implementing a quality assurance program for the measurement of emissions from heavy duty diesel engines are presented. The guidelines include: a description of the measurement system, procedures for performance audits and instrument maintenance, the development of a documentation system, the application of statistical quality assurance methods to the emission test system, analyses of variability in emissions measurement, and procedures and forms for conducting a quality assurance survey of laboratories conducting heavy duty diesel emissions testing. Statistical techniques, nomenclature, and control chart multiplication factors are provided in appendices.

57827

APTIC NO. 81910

Wimette, Harold, Rod Pilkington, and Tom Kelly

GUIDELINES FOR QUALITY ASSURANCE PROGRAMS FOR MOBILE SOURCE EMISSIONS MEASUREMENT SYSTEMS: PHASE II, HEAVY-DUTY DIESEL ENGINES - TEST PROCEDURES (FINAL REPORT). Olson Labs., Inc., Anaheim, Calif., Environmental Protection Agency Contract 68-02-1740, Program Element 1HA327, ROAP 26BGC, Rept. EPA-650/4-75-024-d, 220p., June 1975, 38 refs.

Test procedures for measuring heavy duty diesel engine mobile source emissions are presented within the framework of a total quality assurance system. The procedures are a documentation of the 1975 heavy duty diesel emission measurement test requirements presently in use at the Environmental Protection Agency's Ann Arbor facility. Presentation of the procedures is in document control format, with quality assurance provisions being outlined for each part of the total testing system.

57828

APTIC NO. 83040

Winchester, John W. and Robert A. Duce

PARTICULATE MATTER EXCHANGE ACROSS THE AIR-WATER INTERFACE. Preprint, American Chemical Society, Washington, D. C., 21p., 1975, 76 refs. (Presented at the Fates of Pollutants in the Air and Water Environments, National Meeting, 169th, Philadelphia, Pa., April 6-11, 1975.)

Mechanisms of particulate matter exchange between the atmosphere and bodies of fresh and salt water are reviewed. In some cases the water surface acts as a source of pollution, while in other cases it acts as a sink. The primary mechanism for the production of atmospheric sea salt particles is generally believed to be the bursting of bubbles produced by breaking waves. Certain pollutants present in coastal waters as a result of dumping or sewage outfalls may undergo significant horizontal dispersal due to transport into the atmosphere by wave and bubble action. This is particularly true for pollutants which are surface active or are associated with surfactants in the water.

57829

APTIC NO. 75192

Wisbith, Anthony, Everett Barnett, and Lawrence Elfers

MONITORING VINYL CHLORIDE AROUND POLYVINYL CHLORIDE FABRICATION PLANTS (FINAL REPORT). PEDCo-Environmental Specialists, Inc., Cincinnati, Ohio, Office of Air and Waste Management Contract 68-02-1375, Proj. 20, Rept. EPA-450/3-75-084, 103p., Oct. 1975, 2 refs.

AIR POLLUTION ABSTRACTS, JUNE 1976

NTIS: PB 249695/AS

Vinyl chloride emissions from polyvinyl chloride fabrication plants were monitored using four charcoal collectors stationed around each of five plants. The gas chromatographic analysis of 24-hour samples collected daily for 14 days around each plant revealed vinyl chloride concentrations ranging from less than 0.5 ppb to 5 ppb in most cases. The maximum vinyl chloride level for any single 24-hour period was 7 ppb. Vinyl chloride emissions were detected at three of the five plants investigated. (Author abstract modified)

57830

APTIC NO. 84604

Yajima, Tsunehiro, Kenji Watanabe, Kazuo Hishida Kazuo, and Hisao Nihei

ODOR POLLUTION IN TOKYO. (Tokyo to ni okeru akushukogai no genjo). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):642, 1975. (Presented at the Japan. Society of Air Pollution, Annual Meeting, 16th, Niigata, Nov. 5-7, 1975, Paper 378.)

Odor pollution in Tokyo was tabulated in terms of the number of complaints filed and the types of odors. The total number of complaints filed has increased since 1968, when there were 400 complaints; the total number during 1970 - 1972 was about 3000/year. The number of complaints filed decreased slightly in 1973. Complaints against odor from paint industries were most numerous, 13.6% of the total. The second highest number of complaints was 12.1%, for odor from sewage channels and rivers; this was followed by 10.9% for odors from incineration facilities.

57831

APTIC NO. 83866

Yanagihara, Shigeru, Kenichi Yamashita, and Osamu Shinozaki

PARTICULATES IN AUTOMOBILE EXHAUSTS. (Haikigasuchu no ryujo busshitsu). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):367, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975, Paper 113.)

Particulates in automobile exhaust gas were studied. The exhaust gas from a 2000 cc engine was diluted with dry air in order to prevent the condensation of moisture and the particulates concentration was measured using a small particle concentration monitor. The particulates were also collected by a cascade impactor and Andersen sampler. The particulate concentration in the exhaust gas was constant up to an engine speed of 30 km/hr; then it rapidly increased with increasing engine speed. The particulate concentrations at 20 and 60 km/hr were 0.65 and 1.0 mg/cu m, respectively. The particle size distribution was narrower with lower engine speed. At an engine speed of 60 km/hr, 28% of the particulates in the exhaust gas were less than 1 micron in size, 26% were between 1 and 2 micron, while particles between 11 and 12 micron made up 2% of the particulates found in the exhaust gas.

57832

APTIC NO. 82353

Yanaka, Takaaki

INVESTIGATION ON EMISSION GAS AND ATMOSPHERIC FLUORIDE IN NIIGATA PREFECTURE. (Niigata kenka ni okeru haigasu oyobi taichiku no sukabutsu chosa). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 10(4):235, 1975. (Presented at the National Air Pollution Research Conference, 16th, Niigata, Nov. 5-7, 1975.)

The fluoride in the waste gases from aluminum refineries and phosphatic fertilizer manufacturers was analyzed. The analysis was made for both gaseous fluorides and particulate fluorides by trapping with an alkaline filter paper and millipore filter respectively. Detection was by the ion electrode method, after the dissolution of the trapped fluorides. The total fluoride

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emission ranged from 43 to 568 kg F/cu m, and the particulate fluorides were represented more than the gaseous fluorides, ranging from 41 to 340 kg F/cu m. Fifty to 90% of the particulate fluorides were less than 1 micron in diameter. The particle size distribution curve did not follow the logarithmic normal distribution curve.

57833

APTIC NO. 83243

Yoshida, A.

COUNTERMEASURES AGAINST AIR POLLUTION IN KEIYO DISTRICT. (*Keiyo-chiku no taikiosen taisaku*). Text in Japanese. *Koshu Eisei (Public Health)*, 39(9):588-599, 1975.

Air pollution in Chiba Prefecture began in 1960 when an iron-works was opened in a coastal industrial zone of Tokyo Bay (Keiyo district) that is 76 km in length and 9396 hectares in area and now contains 900 factories. At present there are annual average concentrations of 0.012 - 0.028 ppm of sulfur oxides, 0.008 - 0.041 ppm of nitrogen dioxide, 0.030-0.041 ppm of oxidant and 7.4 - 23.5 t/sq km/month of dust fall. The human effects of such air pollution were surveyed for babies and school-children. The morbidity of bronchial asthma for children and adults indicates that the increase of air pollution should be stopped and countermeasures against pollutant emissions from the existing sources should be taken. Although a national compensation system for patients officially designated as suffering from air pollution is in operation a fundamental measure to control the pollution is required.

57834

APTIC NO. 76345

Yoshida, Jiro

ON INTRODUCTION AND APPLICATION OF TOTAL EMISSION REGULATIONS FOR SULFUR OXIDES IN KANAGAWA PREFECTURE. (*Kanagawa-ken ni okeru io sankabutsu no soryo kisei no donyu to jissai ni tsuite*). Text in Japanese. *Sangyo Kogai (Ind. Public Nuisance)*, 11(8):701-704, 1975.

Various aspects of setting up models for calculation of total emissions in Kanagawa Prefecture are discussed. Kanagawa Prefecture, with an area of 2380 sq km, has 10% of the total national industrial capacity. Yokohama, Kawasaki, and Yokosuka are the three cities in the prefecture where total emission regulations are applicable. Marine traffic in Tokyo Bay also contributes to pollution problems here. The regions were subdivided by using a standard grid defined by the Prime Minister's Office, in which mesh size is based on latitude and longitude. To determine the density of smoke sources, scales of maps used in planning were 25,000:1 for land, and 100,000:1 (sea lane section) for sea. Data were collected at more than 34 points of evaluation, during morning, afternoon, and night periods for the entire year, which was divided into two seasons (heating, November-March; non-heating, April-October). Stack data was collected and simulated for factories, businesses, ships, and land vehicles. Under certain meteorological conditions, for a tanker at berth, exceeding 10,000 tons, effective simulated stack height was 160 m, as compared to the actual stack height of 34 m. Five ground-level meteorological blocks for land, and four blocks for sea (sea lane, 3 ports) were set up. Puff, plume, and Pasquill methods were used in diffusion calculations. Average daily concentration of SOx for the three cities was calculated to be 0.016 ppm.

57835

APTIC NO. 83400

Yoshida, Jiro

SURVEY RESULTS ON THE HYDROCARBON SUBSTANCE EVAPORATION PREVENTION IN KANAGAWA PREFECTURE. (*Kanagawa ni okeru tanka-suisei kei busshitsu no jyoohatsu boshi ni kansuru chosa kekka ni tsuite*). Text in Japanese. *Sangyo Kogai (Ind. Public Nuisance)*, 11(12): 1129-1137, Dec. 1975.

Hydrocarbon (HC) evaporation prevention regulations have been in effect in Kanagawa Prefecture. This necessitated a fact-finding survey in 1974, by the Kanagawa Prefectural Environmental Pollution Control Office, of the industries using or handling HC group substances. Questionnaires were sent to 613 factories. The industries surveyed were limited to the petroleum and painting industries. The results of the survey on the amount of HC stored and handled, the amount of HC evaporation measured, and the estimation of the total HC emission in Kanagawa were tabulated. Photochemical reactions involving hydrocarbons were investigated. The air pollution in Kanagawa Prefecture is greatly influenced by photochemical pollution; therefore, HC emission control has a high priority.

57836

APTIC NO. 84622

Yoshida, Masanori, Yoshikazu Torihashi, Motonori Tamaoki, Saburomaru Tsujimoto, Norio Oki, and Tsuneaki Takada

DIFFUSION OF CO AND NOx AROUND THE ROAD. (*Jidosha haishutsu gasu (CO, NOx) no doro kara no gensu*). Text in Japanese. *Taiki Onsen Kenkyu (J. Japan. Soc. Air Pollution)*, 10(4):332, 1975. (Presented at Japan. Soc. of Air Pollution, Annual Meeting, 16th, Niigata, Nov. 5-7, 1975, Paper 286.)

The diffusion of nitrogen oxides and carbon monoxide from a busy street was studied in Amagasaki City. The street had an average daily traffic flow of 50,000 to 60,000 vehicles; 30% of these were large cars. Nine sampling spots, up to 200 m from the street, were established along a side street which intersected the busy street perpendicularly. Methods used for the determination were Saltzman for NOx and non-dispersive infrared for CO. The measured values were subtracted from baseline levels of NOx or CO measured at remote areas without automobile exhaust gases. The relative NO levels along the 200 m distance were: 100% at 0 m from the busy street; 90% at 20 m; 70% at 40 m; 60% at 60 m; 35% at 100 m; and an even decrease in NO levels, proportional to the distance from the street for the next 100 m. The distribution of the nitrogen dioxide was different from that of NO and NOx. NO decreases in NO2 levels within 100 m from the street were observed. The NO2 levels observed at 100 and 150 m from the busy street were 70% and 50%, respectively. The ratio between NO and NOx levels was 0.78 on the busy street, and was 0.5 at 200 m away. The change in the CO level by distance was very small. The CO level observed at 150 m from the busy street was 90% of the CO level observed on that street. This indicated that the contribution of automobile exhaust gases to the CO level was not significant.

57837

APTIC NO. 83994

Yudilevich, M. M., A. F. Elisseeva, G. V. Fokina, and V. V. Lazanskiy

DETERMINATION OF CYANOGEN COMPOUNDS IN ELECTRIC STEEL MELTING FURNACE FLUE GASES. (*Opređenje tsianistykh soedineniy v otkhodyashchikh gazakh elektrostaleplavil nykh pechey*). Text in Russian. *Gigiena Truda i Prof. Zabolevaniya*, no. 4:58-59, 1975. 3 refs.

Flue gases of an electric steel melting furnace were analyzed for cyanides by the pyridine-barbituric acid method, using three series-connected absorbers. Cyanides were determined photocolometrically by means of a yellow filter with an absorption maximum at 584 nanometers. Cyanides were detected only during the melting period, i.e., during the operation of gas-oxygen burners, which indicates hydrogen cyanide is synthesized from methane and nitrogen. The cyanide concentrations in the flue gases were below the maximum allowable level.

57838

APTIC NO. 83738

Zalai, Andras

MOTOR FUELS. (*Motorhajtoanyagok*). Text in Hungarian. *Magy. Kem. Lapja (Budapest)*, 30(6):320-324, 1975. 4 refs.

Recent developments and future trends in the quality and properties of engine fuels are surveyed. The reduction of the gasoline lead content in many countries during the past years will continue in the future, but Wankel and gas engines are not expected to acquire any major importance despite their more favorable exhaust characteristics. Recent development in the area of diesel fuels is characterized by a reduction of the sulfur content. It is below 0.6% in fuels for high-speed diesels. The sulfur content in domestic diesel fuel has been reduced to 0.5%. The cetane rating was increased recently in certain countries. The mercaptan content in jet fuels is limited to lower standard values.

57839

APTIC NO. 84166

Zalogin, N. G. and L. I. Kroll

POWER PLANT OPERATION AND ENVIRONMENTAL PROTECTION. (*Rabota elektrostantsy i zashchita okruzhayushchey sredy*). Text in Russian. *Teploenergetika*, no. 4:5-7, April 1975. 4 refs.

The effects of fossil fuel electricity production on the cyclical processes of the biosphere are discussed. Nuclear generation releases energy without oxygen consumption and has a less intensive interchange with the environment. The analysis of the economic aspects of air pollution from thermal and nuclear power plants showed that control of toxic impurities in the stack gases (ash, sulfur dioxide, nitrogen) increases the cost of 1 KW generation by 2-5% for the equipment for particulate trapping and 25% for sulfur dioxide absorption devices, while the absorption of radioactive isotopes from nuclear plant gas discharge requires comparatively lower expenditure. Most radioactive isotopes have a relatively short half-life. It has been demonstrated that gas discharges from thermal power plants also contain a certain amount of radioactive elements. Measurements indicate that gas discharge from a 1000 mw thermal power plant contains potassium 40, uranium 238, and uranium 235 reaching 0.72, 2.4 and 2.5 curie/yr, respectively.

57840

APTIC NO. 80194

Zeedijk, H.

SULFUR DIOXIDE EMISSION AND FUEL CONSUMPTION. (*SO₂-emissie en brandstofverbruik*). Text in Dutch. *Chem. Weekblad*, no. 30/31:9-11, Aug. 1975.

The energy and fuel consumption and the sulfur dioxide emissions in the Netherlands are presented for the years 1973 and 1974 on the basis of statistical data. Recession and the oil crisis have kept the energy consumption from growing. While the petroleum and coal consumption have decreased in 1974 from the 1973 levels, the natural gas consumption increased from 38,300,000,000 cu m in 1973 to 41,100,000,000 cu m in 1974, and a further increase to 46,000,000,000 cu m is expected for 1975. Natural gas, being practically sulfur-free, causes no SO₂ emissions in the Netherlands. Most of the coal extracted is used for coking and in the metallurgical industry. While coal was responsible for 25,000 ton of SO₂ emission in 1973, this figure dropped to 15,000 ton in 1974. The SO₂ emission from petroleum products decreased from 304,000 ton to 233 ton, and that generated in petroleum refining dropped from 162,000 ton to 143,000 ton. Sulfuric acid production contributed to the overall SO₂ emission with 20,000 ton in both years. The overall SO₂ emission decreased from 511,000 ton in 1973 to 411,000 ton in 1974.

57841

APTIC NO. 83564

Zitko, V.

TOXICITY AND POLLUTION POTENTIAL OF THALLIUM. *Sci. Total Environ.*, 4(2):185-192, July 1975. 89 refs.

The toxicity and pollution potential of thallium are reviewed. Thallium is slightly more acutely toxic to mammals than mercury, and as acutely toxic as copper to fish. Its present industrial uses are too limited to generate pollution, but Th discharged in wastes from mines, ore processing, and coal burning plants is contaminating the environment. Mining of

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minerals other than sulfides, such as potash and silicates, releases Th into the environment. Coal fired power plants emit Th in fly ash and the concentration of Th increases from 5-43 microgram/g in larger particles to 29-76 microgram/g in airborne fly ash. Thallium concentrations of 1-80 microgram/l are reported in two rivers draining base metal mining properties in New Brunswick. Algae and moss from these rivers contain Th in concentrations ranging from 915 to 162 microgram/g dry weight.

57842

APTIC NO. 75065

York Research Corp., Stamford, Conn.

AIR POLLUTION EMISSION TEST. PARTICLE SIZE ANALYSIS. KAISER STEEL CORP. *Office of Air and Waste Management Contract 68-02-1401, Proj. 75-SIN-3, Task 22, Rept. Y-8479-22, 17p., Aug. 26, 1975. 2 refs.*

Particle size tests were conducted at the outlet of the baghouse at the Kaiser Steel Sinter Plant located in Fontana, California to assist the Environmental Protection Agency in developing criteria for standards of performance for new sintering plants. About 43% of the particles at the outlet of the baghouse were over 6 micron in size. It was not possible to judge whether the outlet distribution was reasonable since the inlet distribution of particles was not known. Also, since no testing was performed at the baghouse inlet, it was not possible to calculate the fractional efficiencies.

57843

APTIC NO. 75102

Office of Air and Waste Management, Research Triangle Park, N. C., Office of Air Quality Planning and Standards

SUPPLEMENT NO. 5 FOR COMPILATION OF AIR POLLUTANT EMISSION FACTORS. SECOND EDITION. *Rept. AP-42, 149p., Dec. 1975. 158 refs.*

A compilation of updated emissions factors is presented for lignite combustion sources, light- and heavy-duty mobile sources (gasoline and diesel), explosives manufacturing sources, and fugitive dust sources. Pollutants covered by the inventory include: hydrocarbons, particulates, sulfur dioxide, nitrogen oxides, and carbon monoxide. The information presented is based on the Public Health Service Publication, *Compilation of Air Pollutant Emission Factors* and on a revised and expanded version of *Compilation of Air Pollutant Emission Factors* published by the Environmental Protection Agency in February 1972. (Author abstract modified)

57844

APTIC NO. 75197

Milwaukee Dept. of Public Works, Milwaukee, Wis. and Consoer, Townsend and Associates Consulting Engineers, Chicago, Ill.

DETENTION TANK FOR COMBINED SEWER OVERFLOW. MILWAUKEE, WISCONSIN DEMONSTRATION PROJECT (FINAL REPORT). *Environmental Protection Agency Proj. 11020FAU, Program Element 1BB034, ROAP/Task 21-ASY-077, Rept. EPA-600/2-75-071, 307p., Dec. 1975. 5 refs.*

The City of Milwaukee evaluated the merits of detention tanks as a practical method for the abatement of combined sewage and overflow discharges from urban areas. A 3.9 million gallon detention tank was constructed to intercept overflow from a 570-acre segment of the city's combined sewer area. Extensive sewer and river monitoring were conducted using 11 automated monitoring stations. Detention tanks were demonstrated to be effective for preventing a large portion of the contaminants in combined sewer overflow from entering receiving waters based on 5 yr of data and modeling studies. (Author abstract modified)

57845

APTIC NO. 75362

Booz-Allen and Hamilton Management Consultants, Bethesda, Md.

REGIONAL EMISSION PROJECTION SYSTEM (FINAL REPORT). *Office of Air and Waste Management Con-*

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tract 68-02-1005, Task 3, Rept. EPA-450/3-75-037, 140p., Feb. 1975. 23 refs.

The Regional Emission Projection System (REPS), a computerized air pollution emissions projection model, is described. The model combines exogenous national and regional economic forecasts with point and area source emission inventories for Air Quality Control Regions to project annual air pollution emission levels for the criteria pollutants carbon monoxide, hydrocarbons, sulfur oxides, nitrogen oxides, and particulates. Projections can be made for any year between 1974 and year 2000. The three basic program elements of the REPS system are: calculation of growth factors from economic and demographic forecasts, projection of emissions from base year inventories, and the application of emission controls.

57846

APTIC NO. 75971

TRW, Inc., Vienna, Va., Transportation and Environmental Engineering Operations

SOTDAT FINAL REPORT. Office of Air and Waste Management Contract 68-02-1007, Task 3, Rept. EPA-450/3-75-070, 96005.003, 14p., July 1975.

NTIS: PB 245052/AS

The Source Test Data (SOTDAT) System is described. The system permits the gathering of source test data from numerous sources and their storage in a computer-accessible data bank in a common format. SOTDAT is designed so that each record described in detail for one run of a stack monitoring test. Each SOTDAT record is keyed to a record in the National Emissions Data System (NEDS); thus, any required source parameters are readily available from a NEDS listing. Probably the most serious problem with the SOTDAT System involves the case where an exhaust gas stream from a single pollution-producing piece of equipment is split into two or more streams, not all of which are sampled. In this situation, there is no correlation between the process rate for the piece of equipment and the emissions as determined by the test. Either the process rate must be reduced a proportionate amount or the emissions increased.

57847

APTIC NO. 76153

Environmental Protection Agency, Research Triangle Park, N. C., Criteria and Special Studies Office

ANNUAL CATALYST RESEARCH PROGRAM REPORT. SUMMARY (ANNUAL REPORT). 1AA002, Rept. EPA-600/3-75-010e, 54p., Sept. 1975. 22 refs.

An annual report of the Environmental Protection Agency's Office of Research and Development Catalyst Research Program concerning the environmental impact and health effects of catalyst equipped motor vehicles is presented. Topics covered include: emissions characterization, measurement method development, monitoring, fuels analysis, toxicology, epidemiology, and control options for unregulated emissions. The principal focus is on catalyst-generated sulfuric acid and noble metal particulate emissions. (Author abstract modified)

57848

APTIC NO. 76154

Environmental Protection Agency, Research Triangle Park, N. C., Criteria and Special Studies Office

ANNUAL CATALYST RESEARCH PROGRAM REPORT. APPENDICES, VOLUME I (ANNUAL REPORT). Program Element 1AA002, Rept. EPA-600/3-75-010b, 233p., Sept. 1975. 33 refs.

An appendix dealing with catalyst-generated sulfate emissions is presented as part of the annual report of the Environmental Protection Agency's Office of Research and Development Catalyst Research Program. Specific topics covered include: a review of currently available emission data for sulfates from catalyst and non-catalyst vehicles, the control of automotive sulfate emissions through fuel modifications, and the production of low-sulfur gasoline.

57849

APTIC NO. 76156

Environmental Protection Agency, Research Triangle Park, N. C., Criteria and Special Studies Office

ANNUAL CATALYST RESEARCH PROGRAM REPORT. APPENDICES, VOLUME II (ANNUAL REPORT). Program Element 1AA002, Rept. EPA-600/3-75-010c, 230p., Sept. 1975. 42 refs.

An appendix dealing with the composition of unleaded gasoline and commercial gasoline additives is presented as part of the annual report of the Environmental Protection Agency's Office of Research and Development Catalyst Research Program. Analyses of gasolines, consumer purchased additive packages, motor vehicle crankcase lubricants, and distillate fuel oils are presented, and gasoline sulfur levels are summarized from the EPA Surveillance Network and the Bureau of Mines Survey. The trace metal composition of unleaded gasoline and fuel additives is also reported. Exhaust emissions data for catalyst and non-catalyst equipped motor vehicles fueled with different gasolines and gasoline additives are given.

57850

APTIC NO. 76158

Environmental Protection Agency, Research Triangle Park, N. C., Criteria and Special Studies Office

ANNUAL CATALYST RESEARCH PROGRAM REPORT. APPENDICES, VOLUME IV (ANNUAL REPORT). Program Element 1AA002, Rept. EPA-600/3-75-010e, 226p., Sept. 1975. 5 refs.

An appendix dealing with the effect of fuels and fuel additives on motor vehicle exhaust particulate emissions is presented as part of the annual report of the Environmental Protection Agency's Office of Research and Development Catalyst Research Program. Vehicle and engine standard tests were performed with 350-cubic inch Chevrolet engines using two different fuel additives and a baseline fuel. A manganese-containing additive, methylcyclopentadienyl manganese tricarbonyl, generally gave higher amounts (g/ms) of emitted particulates than did a polybuteneamine and baseline fuel during both engine stand and vehicle tests. The increase was from 50-100% above the baseline. The manganese-containing additive resulted in emitted particles that were smaller in size than those resulting from the addition of the polybuteneamine additive of those emitted in the absence of any additive. (Author conclusions modified)

57851

APTIC NO. 76159

Environmental Protection Agency, Research Triangle Park, N. C., Criteria and Special Studies Office

ANNUAL CATALYST RESEARCH PROGRAM REPORT. APPENDICES, VOLUME V (ANNUAL REPORT). Program Element 1AA002, Rept. EPA-600/3-75-010f, 269p., Sept. 1975. 75 refs.

An appendix dealing with the development of methods for determining the effect of fuels and fuel additives on the performance of emission control devices as well as the status of mobile source quality assurance programs is presented as part of the annual report of the Environmental Protection Agency's Office of Research and Development Catalyst Research Program. Although two gasoline additives that were tested appeared to exert some negative effect on oxidation catalyst efficiency and hydrocarbon and carbon monoxide exhaust emissions, the effect was not sufficiently pronounced to deem either additive unsatisfactory. Engine stand tests did not result in greater reproducibility or less scatter than vehicle tests. Also, conversion efficiency decreases, as a function of time or miles, were more pronounced in vehicle tests than during 140-hour engine durability tests. (Author conclusions modified)

57853

APTIC NO. 76163

Environmental Protection Agency, Research Triangle Park, N. C., Criteria and Special Studies Office

ANNUAL CATALYST RESEARCH PROGRAM REPORT. APPENDICES, VOLUME VIII (ANNUAL REPORT). Program Element 1AA002, Rept. EPA-600/3-75-010i, 211p., Sept. 1975.

An appendix dealing with measurements of background sulfate concentrations near a heavily travelled highway in the Los Angeles area is presented as part of the annual report of the Environmental Protection Agency's Office of Research and Development Catalyst Research Program. The purpose of the study is to obtain background pollutant levels which can be compared with future pollution levels resulting from the use of catalytic converters on automobiles. Data on the analysis of respirable particulate matter for sulfates and polycyclic organics are presented along with an operations manual for the study. Pollutant concentrations studied thus far indicate that the contribution by pre-1975 automobiles on the freeway investigated can be observed by delta values obtained from upwind to downwind samplers.

57853

APTIC NO. 76259

Dept. of Transportation, Washington, D. C., Federal Aviation Administration

CONCORDE SUPERSONIC TRANSPORT AIRCRAFT (FINAL ENVIRONMENTAL IMPACT STATEMENT) (VOLUME I). 438p., Sept. 1975. 193 refs.

The environmental impact of allowing regular commercial flights by supersonic aircraft is analyzed. The aircraft is described and alternatives are discussed. The air pollutants of concern in the airport vicinity are carbon monoxide, total unburned hydrocarbons, nitrogen oxides, and particulates. Emissions produced by supersonic transports and intercontinental subsonic jets are compared. The stratospheric impact is considered, including the effects on ultraviolet radiation and health, and the climatic effects. The isopleths of emissions concentrations around JFK airport for 1978 are predicted. The carbon monoxide impact of supersonic transports is considered minimal with the highest concentration existing on the airport itself. Total hydrocarbon levels and nitrogen oxides averages are also considered. The overall predicted impact at Dulles airport is minor. Carbon monoxide at the JFK airport terminal vicinity reflects a noticeable impact due to expanded supersonic transport operations. Expanded supersonic transport operations make no significant air quality impact at Dulles Airport when considered on an hourly or 8-hour average basis. The addition of limited supersonic transport operations will not make a significant change in pollutant concentrations on an hourly or 8-hour basis in either the New York or Washington metropolitan areas. Studies indicate that stratospheric sulfur dioxide and water vapor emissions are not likely to produce climatic changes. Comments received on air quality and stratospheric pollution and responses are included.

57854

APTIC NO. 76274

Kumamoto Prefectural Government (Japan)

AUTOMOBILE EMISSION GAS. (*Jidosha haishutsu gasu*). Text in Japanese. In: Environmental White Paper in 1974, p. 34-54, June 1975.

Data on automotive exhaust emissions, concentrations of carbon monoxide, nitrogen dioxide, hydrocarbons, oxidant, and particulates, traffic volume, meteorological factors and the results of particulate composition measured at eight busy intersections in three cities in Kumamoto during 1973 were compiled and analyzed. A comparison to 1972 data indicates that pollutant concentrations have generally increased; however, the air pollution problems due to automotive exhaust emissions were not greatly aggravated. Data concerning the registration of flue gas emission sources in compliance with the regulation are compiled and classified by the type of facilities. Air pollution control measures taken in Kumamoto are

discussed, and a description of the monitoring system for sedimented dust, sulfur oxides, suspended particulates, and fluorine, and the air pollution emergency procedures are given, with maps of measurement points.

57855

APTIC NO. 79625

MECHANISM OF CARBON MONOXIDE GENERATION. (*Issanka tanso no hassei kiko*). Text in Japanese. Toyota Chuo Kenkyusho R D Rebyu (Toyota R and D Review), 11(1):71-79, Sept. 1975. 14 refs.

A general discussion of the mechanism of carbon monoxide formation, based on chemical equilibria and chemical kinetics is given. The CO emission is almost independent of various engine operating conditions, such as the ignition time, gas inlet pressure, engine rotation speed, exhaust pressure, gas inlet valve and exhaust valve overlaps, and the compression ratio. It depends primarily on the air-fuel ratio. Calculation results showed that the observed CO concentration during adiabatic expansion was higher than the calculated value, possibly due to the freezing of the CO in the early stage of the expansion. In the automotive exhaust manifold reactor, the CO oxidation rate was higher at temperatures higher than 1030 K while it was reduced significantly at temperatures below 1030 K. At low nitric oxides concentration (below 200 ppm) and low temperature, the oxidation rate was greatly reduced.

57856

APTIC NO. 79637

Americus

COATINGS UPDATE: POLLUTION AND THE PAINT INDUSTRY. *Pigment Resin Technol.*, 4(8):7-10, 20, Aug. 1975.

Pollution problems are discussed as related to the coatings industry. Ambient air standards for hydrocarbons and the photochemical oxidants are of greatest concern to the coatings industry since they arise from coating solvents. When it was discovered that vinyl chloride exposure may lead to cancer, a temporary standard which reduced permissible exposure levels to 50 ppm was instituted. Respiratory protection must be provided at higher levels. A proposed standard was subsequently provided which described as satisfactory no detectable level of vinyl chloride. Lead and mercury in paint are also discussed. Other pollution problems include asbestos and talc; waste disposal, including dusts; and plant safety. There are coatings now available which comply with air pollution regulations.

57857

APTIC NO. 79754

Yokohama Municipal Office, Bureau of Environmental Pollution Control

STRUGGLE WITH ENVIRONMENTAL POLLUTION: 1974. (*Kogai to no tatakai: Showa 49-nenban*). Text in Japanese. 183p., March 1975.

Pollution administration, nature of pollution, pollution countermeasures, and remuneration for pollution victims in Yokohama City, Japan, are compiled. Causes of environmental pollution in Yokohama are: a huge coastal industrial complex; unplanned municipal construction and expansion; traffic problems; regional problems such as photochemical smog and water quality deterioration in Tokyo Bay. The Bureau of Environmental Pollution Control supervises health, air, water and noise quality, offers guidance, and cooperates with Kanagawa prefectural authorities. Estimated budget for 1974 was \$25.6 million. Monitoring of pollutants is conducted by telemetry and by other means. There is a central air pollution monitoring center. During 1973, there were 28 reported instances of health problems due to photochemical smog, involving 1545 persons. Of this number, 905 middle school students and 300 elementary school students were stricken on the same day in July. This follows a yearly as well as national trend: by age, the number of smog victims increases in the order of high school, elementary school, and middle school students. Produce (such as spinach) was also adversely affected, to the extent of non-

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marketability. Rivers and tributaries are being cleaned up so that some fish are again living in them. Fish-check (raising of fish in industrial waste water) is a valid method of determining water quality. Subsidence due to the use of ground water has slowed down in some areas, because of countermeasure, but continues in other areas. Concentrations of automobile exhaust pollutants (carbon monoxide, hydrocarbons, nitrogen oxides) in the air remained constant in 1973. Railroad noise and vibrations are being investigated. There were 1379 reported complaints in 1973, of which 706 were resolved.

57858

APTIC NO. 79789

MECHANISM OF UNBURNED HYDROCARBON GENERATION. (Minensho tanka suiso no hassei kiko). Text in Japanese. Toyoda Chujo Kenkyusho R D Rebyu (Toyoda R and D Review), 11(1):58-70, Sept. 1975. 23 refs.

Unburned hydrocarbons result from the flashless action of the wall of combustion chambers; the condensation of fuel on the wall during the inlet and compression strokes; the heterogeneous mixing of the fuel and air followed by partial ejection from the combustion region; the heterogeneous mixing of the combustible gas and the residual combustion gas followed by the ejection from the combustion region; and the absorption of the adsorption of the fuel on the adhesive substances on the wall during inlet and compression strokes and ejection during the expansion and exhaust strokes. A flashless layer of 0.05 mm to 0.5 mm was observed on the wall of a 4-cycle flash ignition engine. Extraction of the gas from the flashless layer at a low extraction rate showed that the hydrocarbon concentration was as high as several thousand ppm. The hydrocarbon concentration increased with increasing ratio of the surface area to the volume of the combustion chamber. The hydrocarbons were emitted mainly in the initial and the final stages of the exhaust stroke.

57859

APTIC NO. 80639

Energy and Environmental Analysis, Inc., Arlington, Va. and AVRAM Co., Falls Church, Va.

APPENDIX 3. AUTOMOTIVE SULFATE EMISSIONS. In: *An Analysis of the Automotive Sulfate Question, Manufacturers of Emission Controls Association Contract*, 43p., 1975. 39 refs.

The emission of sulfates from automobiles equipped with catalytic converters is discussed. Sulfate emission rates are dependent on fuel composition, vehicle design, and the pattern of vehicle operation. Important factors include the oxygen level in the exhaust, catalyst temperature, catalyst type, fuel economy, and the fuel sulfur content. Sulfate emission rates for oxidation catalysts vary from 0.001-0.07 g/mi. Sulfate emissions are highest for the conventional platinum or platinum/palladium catalyst with air injection and lowest for the three-way catalyst system. The dilution tube condensation method appears to be satisfactory for measuring exhaust sulfate levels, although tests for undeveloped cars may vary by 20%. (Author summary modified)

57860

APTIC NO. 81871

Booz-Allen and Hamilton, Inc., Bethesda, Md.

MANUAL OF INSTRUCTIONS FOR PROJECTING EMISSIONS IN SMALL GEOGRAPHIC AREAS - PRELIMINARY TEST USING BALTIMORE AQMA DATA (FINAL REPORT). Office of Air and Waste Management Contract 68-02-1005, Rept. EPA-450/3-76-006, 75p., Jan. 1975. 16 refs.

NTIS: PB 251559/AS

Results from a field test of procedures for estimating present and future air pollution emissions are presented based on data obtained from the Baltimore, Maryland Air Quality Maintenance Area. The results are intended to provide guidance and direction for developing and improving a comprehensive

emission inventory and for projecting future emissions at the county level. Source categories covered include: industrial processes, fuel combustion, transportation, electric generation, incineration, and miscellaneous area sources. Specific procedures, data sources, and tabulating formats for updating or creating a point and area source emission inventory are provided.

57861

APTIC NO. 81917

Union Carbide Corp., Oak Ridge, Tenn., Office of Safety and Environmental Protection

ENVIRONMENTAL MONITORING REPORT. UNITED STATES ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION. PADUCAH GASEOUS DIFFUSION PLANT. CALENDAR YEAR 1974. In: *Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 2, Energy Research and Development Administration, Washington, D. C., Rept. UCC-ND-303, p. 1003-1033, 1975. 5 refs.*

NTIS: ERDA-54

Environmental monitoring data obtained in the vicinity of the Paducah Gaseous Diffusion Plant are presented. The plant operations are involved with uranium enrichment and with uranium hexafluoride manufacturing. A steam plant on the grounds burned gas and oil during 1974 and was in compliance with the Kentucky air pollution control regulations for particulates and sulfur oxides. An indicator was taken out of operation during the third quarter of 1974 because visible emissions appeared to violate Kentucky regulations. The incinerator is scheduled for return to service when repairs to its off gas scrubber are complete. Ambient fluoride concentrations in the vicinity of the Paducah installation ranged from less than 0.11 to 4.56 ppm (as hydrogen fluoride) during 1974.

57862

APTIC NO. 81919

Westinghouse Electric Corp., Pittsburgh, Pa.

EFFLUENT AND ENVIRONMENTAL MONITORING REPORT FOR CALENDAR YEAR 1974. BETTIS ATOMIC POWER LABORATORY. In: *Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 1, Energy Research and Development Administration, Washington, D. C., Energy Research and Development Administration Contract AT(36-1)-GEN-14, Rept. WAPD-RS(RCT)-1227, p. 599-625, 1975. 10 refs.*

NTIS: ERDA-54

Environmental monitoring activities at the Bettis Atomic Power Laboratory during 1974 are reviewed and show that existing procedures for controlling airborne and other effluents are such that all releases are made in accordance with the applicable federal regulations. The total airborne particulate and gaseous radioactivity, with radionuclide decay half-lives greater than 1 day, released from the laboratory during 1974 was less than 0.002 curie. Emission rates of sulfur dioxide, nitrogen dioxide, and particulates generated by the laboratory were 1.7, 14.5, and 2.7 lb/hr for 1974. The estimated airborne emissions from the laboratory's heating system and hood exhausts were well below the permissible discharge limits.

57863

APTIC NO. 81921

General Electric Co., Schenectady, N. Y.

KNOLLS ATOMIC POWER LABORATORY ANNUAL ENVIRONMENTAL MONITORING REPORT 1974. In: *Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 1, Energy Research and Development Administration, Washington, D. C., Rept. KAPL-M-7403, p. 627-684, 1975. 17 refs.*

NTIS: ERDA-54

Environmental monitoring data for three government owned sites comprising the Knolls Atomic Power Laboratory are presented. Source monitoring of steam boilers operated at the Knolls site and the Kesselring site indicates that the opacity of smoke emissions during 1974 averaged less than 2% at each site. The sulfur loading in the gaseous effluents from each boiler facility conformed to the New York State standard, and particulate emissions from each site did not exceed the standard of 0.1 lb/million Btu. The smoke emission density during 1974 at the Windsor site averaged less than 1% opacity. The sulfur loading in the boiler stack gas conformed to the Connecticut State standard, and particulate emissions from the boiler stacks did not exceed the standard of 0.2 lb/million Btu.

57864

APTIC NO. 81931

ANNUAL ENVIRONMENTAL REPORT 1974. DUQUESNE LIGHT COMPANY. BEAVER VALLEY POWER STATION AND SHIPPINGPORT ATOMIC POWER STATION. In: *Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 1, Energy Research and Development Administration, Washington, D. C., p. 685-790, 1975. 3 refs.*

NTIS: ERDA-54

Environmental monitoring operations involving the sampling of airborne emissions and the measurement of ambient air pollution levels at the Duquesne Light Company's Beaver Valley power station and Shippingport atomic power station are reviewed. A total of 26,530 cu ft of gas was released from the Shippingport station's vent gas system with a total radioactive activity of less than 0.001 curies. There were no other forms of airborne releases at the Shippingport station during 1974. The Beaver Valley power station was not in operation during 1974, and no airborne releases were made during the reporting period. Dust fall measurements made in 1972 at a distance of about 1.5 mi upstream of the Beaver Valley and Shippingport sites indicated that the yearly total dust fall averaged 12 tons/sq mi. The annual arithmetic mean sulfur dioxide level during this period was 0.013 ppm. Other pollutants identified at this upwind site included: fluorides, nitrates, sulfates, manganese, nickel, calcium, zinc, chromium, iron, lead, arsenic, cadmium, vanadium, and beryllium.

57865

APTIC NO. 81935

Union Carbide Corp., Oak Ridge, Tenn., Office of Safety and Environmental Protection

ENVIRONMENTAL MONITORING REPORT. UNITED STATES ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION OAK RIDGE FACILITIES. CALENDAR YEAR 1974. In: *Environmental Monitoring at Major U. S. Energy Research and Development Administration Contractor Sites. Vol. 2, Energy Research and Development Administration, Washington, D. C., Rept. UCC-ND-302, p. 945-1001, 1975. 34 refs.*

NTIS: ERDA-54

Environmental monitoring data obtained at the Energy Research and Development Administration Oak Ridge facilities are reported. The average airborne concentrations of particulates and sulfur dioxide were in compliance with applicable standards during 1974, although fluoride concentrations exceeded the standards on several occasions. Annual average fluoride concentrations ranged from 0.9-1.3 ppm. The average particulate concentrations ranged from 40.9-47.8 microgram/cu m, and the annual arithmetic mean sulfur dioxide concentration was 0.013 ppm. Steam plant operations were in compliance with state emission limits except for the steam plant at the Oak Ridge Gaseous Diffusion Plant. Between 0.8 and 1.0 lb/million Btu of particulate emissions were released when coal was burned, and the gaseous effluent from this facility exceeded the 1.60 lb SO₂/million Btu by 0.04 lb when 1.1% sulfur coal was burned.

AIR POLLUTION ABSTRACTS, JUNE 1976

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APTIC NO. 82192

WASTE WATER INCINERATION. (Abwasserverbrennung). Text in German. Chem. Ind. (Duesseldorf), 27(6):319-320, 1975.

General technical and environmental aspects of wastewater incineration are described. Wastewaters with a minimum calorific value of 450-700 kcal/kg or with a minimum organic matter content of 10% are primarily suitable for incineration. The construction of incinerators without emission control devices can be authorized if the organic carbon, carbon monoxide, hydrochloric acid, hydrofluoric acid, sulfur dioxide, nitrogen oxides and dust emissions are expected to be below the maximum allowable values envisaged in the Technical Guidelines on Clean Air Maintenance. Otherwise, dust, CH₄, and SO₂ emissions can be controlled relatively easily, while the removal of aerosols, formed at temperatures of 850 C and over, is problematic. Electrostatic precipitation, cyclone separation, wet scrubbing, and dry gas cleaning can be considered. Wetted tissue filters operating at 95-99% at pressure losses of 200-400 mm water column are best for this purpose. However, they require flue gas cooling to 100-130 C.

57867

APTIC NO. 82771

Environmental Protection Agency, Ann Arbor, Mich., Technology Assessment and Evaluation Branch

IDLE FUEL CONSUMPTION IN PASSENGER CARS. Preprint, 9p., July 1975.

Passenger cars (1972-1974 model years) using conventional gasoline engines and representative of in-use vehicles were selected from the areas of Denver, Detroit, and Houston for measurements of idle mass emissions and fuel consumption. The average idle mass emissions of hydrocarbons, carbon monoxide, and nitrogen oxides were 0.90, 16.4, and 0.25 g/min, respectively. Fuel consumption at idle averaged 0.82 gal/hr. Diesel and stratified charge vehicles showed significantly lower idle fuel consumption than did conventional vehicles.

57868

APTIC NO. 82900

Ashiya Municipal Office, Div. of Citizens

ENVIRONMENTAL POLLUTION. (Kogai). Text in Japanese. 164p., 1975.

The status of pollution in Ashiya is reviewed. The city, general meteorological conditions in recent years, the organizational structure of the pollution control administration, and a chronological record of the pollution control administration and pollution related complaints are given. Data on settling dust, sulfur oxides, suspended particulates, nitric oxide, nitrogen dioxide, nitrogen oxides, carbon monoxide, photochemical smog, and meteorological conditions (wind direction, wind velocity, temperature, humidity) obtained during 1974 are compiled and analyzed with respect to the environmental standards. The status of water pollution in rivers and facilities regulated under the Water Pollution Control Law and Ordinance are described with water pollution measurement data. Data on noise, vibration, and malodor pollution are compiled and analyzed. Descriptions of the 5th Pollution Control Plan in the Kobe Area, pollution monitoring activity, environmental standards and photochemical smog control measures are also given.

57869

APTIC NO. 82966

Saitama Prefecture Environmental Pollution Research Center

ON THE CADMIUM POLLUTION CAUSED BY A CEMENT FACTORY. (Semento kojo yori no kadamiumu o sen ni tsuite). Text in Japanese. Saitama-ken Kogai Senta Nenpo Annu. Rept. Saitama Pref. Environ. Pollut. Res. Cent., no. 2:81-85, 1975. 2 refs.

A preliminary investigation of volatile cadmium and lead pollution due to the dust discharged from a few large cement plants in Saitama is described. The dust in the smoke stack of a ce-

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ment plant in Hidakamachi was selected as the object of the investigation. The cadmium content in the discharged dust was much higher than the content of cadmium found in the raw material for cement and in the cement products. Sampling of the soil containing dust deposits was undertaken. The deposit gage indicated that the area within 500 m of the plant contained a larger amount of cadmium than the national average of cadmium content for any soil. However, in other areas of Saitama Prefecture there was not any definite relation between cadmium pollution and cement manufacture.

57870

APTIC NO. 83413

Environmental Protection Agency, Ann Arbor, Mich.,
Technology Assessment and Evaluation Branch

PASSENGER CAR FUEL ECONOMY - DYNAMOMETER
VS. TRACK VS. ROAD. Preprint, 30p., Aug. 1975. 2
refs.

Differences in fuel economy results obtained from Environmental Protection Agency dynamometer tests and from actual driving on test tracks and roads are reported. Tests with six vehicles selected to cover a broad range of vehicle weight classes showed that dynamometer results agreed with results obtained when driving the EPA Highway Cycle on a test track to within 4.9% on the average. Every vehicle tested was able to meet or exceed the highway fuel economy listed in the Buyer's Guide when driven on actual highways. Detailed exhaust emission results obtained from each test are presented for hydrocarbons, carbon monoxide, and nitrogen oxides.

57871

APTIC NO. 83425

Environmental Protection Agency, Ann Arbor, Mich.,
Technology Assessment and Evaluation Branch

INVESTIGATION INTO HYDROGEN SULFIDE ODOR
PROBLEM ON A PRIVATELY OWNED, CATALYTIC
CONVERTER-EQUIPPED 1975 AUTOMOBILE.
Preprint, 6p., June 1975. 1 ref.

Exhaust emissions tests and a vehicle inspection were performed on a privately-owned 1975 Plymouth Grand Fury equipped with a catalytic converter at the request of the owner who reported an exhaust odor resembling rotten eggs. Hydrocarbon, carbon monoxide, and nitrogen oxide emissions, as measured over the Federal Test Procedure, were 1.92, 93.63, and 2.54 g/mi, respectively. The rotten egg odor was due to hydrogen sulfide emissions which were caused by an extremely rich carburetor setting. The air-fuel ratio was about 11:1. Leaning of the air-fuel mixture to a ratio of about 15:1 eliminated the H₂S problem and reduced hydrocarbon and carbon monoxide emissions to normal levels.

57872

APTIC NO. 83426

Environmental Protection Agency, Ann Arbor, Mich.,
Technology Assessment and Evaluation Branch

OCTANE REQUIREMENTS OF 1975 MODEL YEAR AUTOMOBILES FUELED WITH UNLEADED GASOLINE.
Preprint, 27p., Aug. 1975. 8 refs.

Octane requirements of 1975 model year automobiles fueled with unleaded gasolines are discussed in terms of potential knock problems and their effects on exhaust emissions. Information concerning the effect of engine knock on exhaust emissions is scarce but indicates that light-knock operation increases nitrogen oxide emissions and exerts a negligible effect on carbon monoxide and hydrocarbon emissions. The use of spark retard to reduce engine knock in the absence of higher octane gasoline is not expected to impede fulfillment of the 1975 emission regulations, although large retardations in spark timing can significantly increase CO emissions.

57873

APTIC NO. 83485

Kyoto Municipal Inst. for Public Health

STUDIES REGARDING ATMOSPHERIC ISSUES. (Chosa Kenkyu). Text in Japanese. Kyoto Shi Eisei Kenkyusho Nenpo (Annu. Rept. Kyoto Prefect Inst. Public Health), no. 41:94-100, Oct. 1975.

Investigations related to air pollution during fiscal year 1975 are presented. The following subjects are discussed: a low volume air sampler for measuring airborne suspended particulate matter; stack exhaust gas; the amount of aromatic hydrocarbons in gasoline; photochemical reactions and air pollutants; experiments on pollutants capable of photochemical reaction; the prevention of noxious odors generated from organic solvents; and factors that reduce airborne carbon monoxide. The generation of carbon monoxide related to human activity is increasing rapidly; 90% is from automobile exhaust. A study was conducted from 1971 to 1974 of factors that reduce airborne carbon monoxide. Soil and broad-leaf trees naturally reduced carbon monoxide. If it is heated to 500 C or more, CO is reduced rapidly.

57874

APTIC NO. 83543

Fukui Prefectural Government

SURVEY REPORT ON FLUORIDES IN THE NATURAL
ENVIRONMENT OF FUKUI AND SAKAI REGIONS.
(Fukui, Sakai chiku ni okeru shizen kankyo chu no fukukabutsu chosa hokokusho). Text in Japanese. 86p., March 1975. 49 refs.

Fluoride concentrations in the environment of the Fukui and Sakai regions were surveyed from April 1972 to March 1975, prior to the establishment of an aluminum refinery in the Fukui Coastal Industrial Area in 1977. Fluoride (F) concentrations in all cases were in the range of normal natural concentrations. Values were as follows - Farm produce: leaves below 20 ppm; rice, about 8 ppm. Soil: 110-530 ppm (average 313 ppm). Ocean water (not at a river mouth): 1.0-1.2 ppm. Marine produce: Sea urchins and marine algae showed higher concentrations in comparison to fish, shellfish, and crustaceans. Pines: 1-3 ppm, for both first-year and second-year needles; ponderosa pines, highly susceptible to fluoride pollution, were suggested as possible pollutant indicators. Weeds (primrose, clover, mugwort): about 10 ppm. Drinking water: 0.02-0.37 ppm (average 0.12 ppm). Atmosphere: average relative concentrations, 6.3 microgram F/sq dm/month (absolute concentrations, less than 0.018 microgram/cu m. Rain water: average soluble F concentration 0.013 ppm. Water-soluble F precipitants: 1.21 kg F/sq km/month. River water: average 0.10 mg/l. Environmental guidance standards for fluorides in Fukui prefecture were suggested as follows: continuous 24-hour value, below 1.0 microgram/cu m; continuous one-week value, below 0.5 microgram/cu m.

57875

APTIC NO. 84149

Saitama Prefectural Environmental Pollution Center (Japan)

FACT FINDING INVESTIGATION ON THE DUST POLLUTION BY CUPOLA IN KAWAGUCHI REGION.
(Kawaguchi chiku ni okeru kyupora funjin kogai jitrai chosa). Text in Japanese. Saitama-ken Kogai Senta Nenpo (Annu. Rep. Saitama Pref. Environ. Pollut. Res. Cent.), no. 2:67-80, 1975. 4 refs.

The Saitama Prefectural Environmental Pollution Center has investigated the particle size distribution of dust emitted from cupolas (which exhaust soot containing iron, manganese, and zinc) in the Kawaguchi district in 1973. High volume air samples were used at the two measuring locations, an area with many foundries and its surrounding area, during June and July 1973. A great difference in manganese volume was found between the foundry area and its surrounding area. When particle size was classified into eight stage classifications from 0.08 micron to 30 micron, the distribution of aerosol particle size showed peaks in stage 4 (3.3 to 4.7 micron) and in stage 8 (0.43 to 0.65 micron) in both areas. The metal particle distribution varied according to each metal. Iron had a peak in size 3.3 to 4.7 micron, and lead and zinc peak to 0.43-0.6 micron and 6 micron, whereas manganese has a large peak at 0.4 micron and a small peak at 4 micron. Therefore it is concluded that one peak of aerosol size distribution, stage 4, is related to the iron particles, and another peak, stage 8 is related to zinc, lead and manganese.

57876

APTIC NO. 84410

Stichting CONCAWE, the Hague (Netherlands)

THE IDENTIFICATION AND MEASUREMENT OF REFINERY ODOURS. *Rept. 8/75, 36p., Dec. 1975. 9 refs.*

The identification and measurement of refinery odors are described. Oil refineries generally do not have a continuous odor problem. Most complaints are due to intermittent faults during plant operation. Sulfur compounds, particularly hydrogen sulfide and mercaptans, are the main source of odor from refineries. Unsaturated hydrocarbons and aromatics cause odor problems less frequently. Sulfur compounds are determined down to 1 ppb using preconcentration techniques followed by gas liquid chromatography with a flame photometric detector. Hydrocarbons are determined down to 1 ppm directly by gas liquid chromatography and down to 1 ppb if preconcentration is used. Odor panels are necessary where an instrumental method is not available. (Author conclusions modified)

57877

APTIC NO. 84466

Asphalt Inst., College Park, Md.

ASPHALT HOT MIX EMISSION STUDY. *Research Rept. 75-1, 111p., March 1975. 32 refs.*

Eight complete sets of emission samples were taken at two hot mix asphalt plants involving four asphalts from three refineries. Most of the air contaminants were at extremely low concentrations and fell well within currently applicable limits established by the Occupational Safety and Health Administration. Analysis of gaseous substances included: carbon monoxide, nitrogen dioxide, sulfur dioxide, hydrogen sulfide, carbonyl sulfide, mercaptans, ozone, aldehydes, phenols, and carbon 2 to C14 hydrocarbons. Solid particulates contained only trace amounts of polynuclear aromatic hydrocarbons and metal compounds. There was not a serious air pollution or employee health problem resulting from the use of petroleum derived asphalt in hot mixes. (Author abstract modified)

1974

57878

APTIC NO. 79820

Andersen, Ib., Gunnar R. Lundqvist, and Lars Molhave

FORMALDEHYDE IN THE ATMOSPHERE IN DANISH HOMES. (*Formaldehyd i indeluft i danske boliger*). Text in Danish. *Ugeskr. Laeg., 136(36):2133-2139, Sept. 16, 1974. 26 refs.*

Measurements of the formaldehyde content of the indoor atmosphere and indoor and outdoor climatic parameters were taken in 25 rooms in 23 dwellings, mainly in new or recent one-family houses with varying quantities of particle board. The formaldehyde content in the indoor atmosphere averaged 0.62 mg/cu m air with a range from 0.08 to 2.24 mg/cu m air. Concentrations in two rooms were higher than 1.2 mg/cu m, the maximum permitted for workshops; in 17 rooms the values were higher than 0.40 mg/cu m, a calculated value for long term exposure; and in eight rooms the values were lower than this. All of the values however, were higher than the recommended values for outdoor air, 0.03 mg/cu m. Newly built dwellings had the highest formaldehyde concentrations in the indoor air, and this concentration decreased with increasing age of the building. The formaldehyde concentration also diminished with increasing rates of ventilation. Inhabitants of the houses with formaldehyde concentrations higher than the calculated value for long term exposure will presumably experience effects in the upper respiratory tract. A program of action is advanced with proposals for temporary and permanent public health measures. (Author abstract modified)

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57879

APTIC NO. 73489

Andersson, Gun and Peringe Grennfelt

THE CONCENTRATION OF SOME TRACE ELEMENTS IN FUEL OILS AND THE ESTIMATION OF THE ATMOSPHERIC EMISSION OF THESE ELEMENTS FROM OIL COMBUSTION IN SWEDEN. *Swedish Water of Air Pollution Research Lab., Gothenburg (Sweden), Rept. B 204, 13p., Sept. 1974. 7 refs.*

The concentrations of various trace elements in 10 different fuel oils used in Sweden were measured and used along with statistics on fuel oil deliveries for 1972 to estimate oil combustion emission factors. The calculated emission factors for bromine, chlorine, iodine, indium, phosphorus, antimony, scandium, and selenium in tons/year for 1972 were: 14, 1000, 2.1, 0.00093, 310, 0.048, 0.0043, and 1.6. The calculations were made assuming that the total amount of each element in the oil was emitted to the atmosphere.

57880

APTIC NO. 81781

Archer, Wesley L.

SELECTING ALTERNATIVE CHLORINATED SOLVENTS. *Metal Progr., vol. 1974:133-134, 136, 138, 140, 142, 144, 146, Oct. 1974.*

The substitution of exempt solvents for trichloroethylene which has been widely used in metal degreasing applications is discussed in the face of Environmental Protection Agency and Occupational Safety and Health Administration regulations. The threshold limit value (appearance of anesthetic effects in humans) of trichloroethylene is 100 ppm as compared to 350 ppm for 1,1,1-trichloroethane, 500 ppm for methyl chloride, and 100 ppm for perchloroethylene. In many cases a suitable inhibited grade of 1,1,1-trichloroethane is the most logical replacement for trichloroethylene because its physical properties best match those of trichloroethylene. Methylene chloride may be the solvent of choice for removing a difficult soil. If the vapor degreasing application involves a drying operation, then perchloroethylene is perhaps the best selection. An additional advantage is that perchloroethylene meets all current and proposed air pollution regulations.

57881

APTIC NO. 76024

Berlyand, M. Y., S. A. Konkov, and B. B. Shilin

AEROGEOCHEMICAL SURVEY FOR INVESTIGATION OF GROUND SURFACE OBJECTS AND ATMOSPHERIC POLLUTANTS OF NATURAL ORIGIN. In: *Atmospheric Diffusion and Air Pollution Problems, Voprosy atmosfernoï diffuzii i zagryazneniya vozdukh, Leningrad, Gidrometeoizdat Press, 1974, 225p. 16 refs. Translated from Russian, 24p.*

Gas aureoles of sulfur dioxide and hydrogen sulfide, registered in-flight from helicopters over the active Karymskiy volcano and areas of geothermal activity in Kamchatka, are analyzed. The optimum procedure for this kind of measurement is described, and an essential difference is shown in the character of aureoles over volcanoes and areas of geothermal activity (fumaroles). It is possible to gauge the increase of volcanic activity from an increase in the concentration of SO₂ with time. A coulomb-polarographic analysis using helicopter platforms is recommended for such aerogeochemical measurements. Field operations with this apparatus are described. Gas aureoles measured over fumaroles contained a predominance of H₂S (90-100%, occasionally 50-60%) over SO₂. Measurements of H₂S and SO₂ from 8 eruptions of Karymskiy volcano showed H₂S concentrations rarely reaching 50% of the total. Volcanic activity in the survey period exhibited a sequence of 2 types of explosion: violent gas-ash explosions with gas content from 0.8 to 2.4 mg/cu m, and gas with gas content less than 0.25 mg/cu m. The use of measurements of evaporation aureoles of many chemical elements and compounds in soils and minerals and over the oceans is discussed; uses include prospecting, the study of marine life, and the study of volcanic activity and emissions.

EMISSION SOURCES

57887

57882

APTIC NO. 80182

Briat, M., C. Boutron, and C. Lorius

CHLORINE AND SODIUM CONTENT OF EAST ANTARCTICA FIRN SAMPLES. *J. Rech. Atmospheriques*, 8(3-4):895-901, July-Dec. 1974. 17 refs. (Presented at the International Symposium on the Chemistry of Sea/Air Particulate Exchange Processes, Nice, France, Oct. 4-10, 1973.)

Chlorine and sodium contents were measured in 70 surface firn samples collected along a 830 km coast interior traverse in East Antarctica. The mean values obtained in 14 stations ranged from 740 to 70 ppb for Cl and 560 to 7 ppb for Na. There is a very marked decrease in the concentrations from the coast to 40 km inland. The concentrations then remain more or less constant. Near the coast the weight ratio Cl/Na is slightly lower than the bulk sea water ratio. Further on it reaches very high values and decreases near the end of the traverse. The high Cl/Na weight ratio values can be tentatively explained by an input of gaseous chlorine. (Author abstract)

57883

APTIC NO. 79295

Cheremisinoff, Nicholas P.

PLANT SITE SELECTION FACTORS. In: *Industrial Odor Technology Assessment*. Paul N. Cheremisinoff and Richard A. Young (eds.), Ann Arbor, Mich., Ann Arbor Science Publishers, Inc., 1974 (?), Chapt. 30, p. 457-467.

Factors affecting the site selection of a facility with potential odor problems are reviewed. A systematic approach in which terminology is first defined and major selection factors are identified prior to the undertaking of a site survey is described. Topics reviewed include: the use of air quality information banks, the preparation of odor and air pollution standards, the interaction of different pollutants emitted from a facility and their impact on the surrounding environment, meteorological conditions affecting odor dispersion and transport, legal aspects of odor control, production and transportation cost factors involved in selecting a plant location, factors associated with the treatment and disposal of liquid and solid wastes, short-cut approaches to plant site surveys, and the use of information from various government agencies to aid in plant site selection.

57884

APTIC NO. 76044

Chovin, M.

METHODS OF REDUCING EMISSIONS OF NITROGEN OXIDES AND HYDROCARBONS USED OR UNDER STUDY IN FRANCE. (*Methodes de reduction des emissions d'oxydes d'azote et d'hydrocarbures utilisees ou a l'etat d'etudes en France*). Translated from French, 32p., 1974 (?).

Recent research and control programs concerned with nitrogen oxides emissions from furnaces, industrial boilers and ovens, and thermal power generation in France are described. Reaction kinetics of the formation and decomposition of nitric acid during combustion, with emphasis on NO formation in the flames of hydrocarbons, and on the mechanism of NO formation from nitrogenized fuel, have been studied; hydrocyanic acid is found to be a determining intermediate in some reactions. Emission levels of main furnace types have been determined. The relation of the structure of burners and combustion chambers to emission levels has been studied. Two-stage combustion, air recirculation, water injection, fluidized bed combustion, and control of excess air are reviewed as control measures. Emissions and control measures concerning internal combustion engines are reviewed. Nitrogen oxides emissions from the nitric acid industry are reviewed and control measures discussed.

57885

APTIC NO. 80174

Coello, W. F., Z. A. Salerni, and M. A. Q. Khan

ECOLOGICAL EFFECTS OF LEAD IN AUTO EXHAUST. In: *Survival in Toxic Environments*. M. A. Q.

Khan and John P. Bederka, Jr. (eds.), New York, Academic Press, 1974, p. 499-513. 2 refs.

The transport of lead from engine exhausts and its ecological effects are reviewed. There is a fairly direct relationship between traffic count on a given highway and soil content of Pb in close proximity to the highway. Atmospheric Pb concentrations stabilize at low levels approximately 100 ft from the road. About 85% of the Pb in the air between 30-1750 ft from the roadway is particulate and under 4 micron in diameter and about 80% of this is under 2 micron in diameter. Factors affecting theoretical atmospheric Pb contamination from auto exhaust include volume of traffic, local meteorology, traffic pattern, vehicle condition, and driving habits. The soil receives 1 microgram/sq cm/yr of Pb from precipitation, while 0.2 microgram/sq cm/yr is deposited as dustfall. Since airborne Pb settles on plant surfaces, leaf size and shape are critical factors in plant contamination. Lead inhibits plant growth and causes reduction of photosynthesis, water absorption, and may cause copper deficiency. Animals in areas with high atmospheric Pb levels can become contaminated either by inhalation or by feeding on contaminated food. Lead enters the human body through the respiratory tract by inhalation of air contaminated with auto exhaust.

57886

APTIC NO. 83035

Cooper, Hal B. H., Jr. and Ghassan M. Mahdi

AIR POLLUTION IMPACT OF MARITIME SHIPPING OPERATIONS IN THE PORT OF HOUSTON. *Coastal Zone Manage. J.*, 1(4):415-432, 1974. 20 refs.

The impact of maritime shipping operations on air quality is discussed, with particular reference to the port of Houston. Major air pollutants from maritime shipping operations are sulfur oxides, nitrogen oxides, and particulate matter resulting from the combustion of fuel oil during cruise, berth, and start-up modes. Sulfur oxide emissions are substantial from steamships burning high-sulfur residual fuel oil, and nitrogen oxide emissions are significant during cruise conditions for both steamships and motor ships. Particulate emissions are substantial during start-up and tube cleaning. Offshore terminals for unloading large tankers may result in emissions of 10-20 tons of sulfur oxides daily per ship and 3-5 tons of nitrogen oxides daily per ship during pumping operations. Trace metal constituents present in the oil may catalyze sulfur dioxide and nitrogen dioxide oxidation, resulting in the production of sulfate and nitrate aerosols in the humid Texas Gulf Coast atmosphere. Shipping contributes about 66% of the total sulfur dioxide emissions from transportation sources and almost 3% of the total for Harris County, Texas. (Author abstract modified)

57887

APTIC NO. 83457

Civrtinick, Thomas, Stanley J. Rusek, and Charles W. Sandy

EVALUATION OF LOW-SULFUR WESTERN COAL CHARACTERISTICS AND UTILIZATION. *American Inst. of Chemical Engineers*, New York, Dayton and Ohio Valley Sections and Air Pollution Control Assoc., Pittsburgh, Pa., Technical Committee on Energy-Environmental Interactions, Energy Environ. Natl. Conf., 2nd Oxford, Ohio, 1974, p. 102-106. 9 refs. (Nov. 13-15.)

Low sulfur western coal reserves are discussed in terms of availability, air pollution impact, and power plant changes required for their utilization. Over 66% of the total estimated coal reserves in the west contain 0.7 wt% or less sulfur. Reserves amounting to 200 billion tons are known to exist in the states of Arizona, Colorado, Montana, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming. Production amounted to 50.6 million tons in 1972, with about 30% of this being shipped to non-western states. The coal's inherent low sulfur content and increased sulfur retention in the ash make its use advantageous in terms of meeting sulfur restrictions. However, the resistivity of the fly ash is higher than non-western coals and results in lower collection efficiencies when electrostatic precipitators are used. This

problem can be overcome, nevertheless, by the use of hot side electrostatic precipitators. The use of low sulfur western coal also requires boiler design changes. (Author abstract modified)

57888

APTIC NO. 80262

Demers, Dan, Joe Feimer, Tom Hamilton, Robert Murray, A. W. Gnyp, G. F. Mathur, S. J. W. Price, G. Ryan, C. C. St. Pierre, D. S. Smith, G. Underwood, and G. Wood

PRELIMINARY INVESTIGATIONS OF ODOR CONTROL AT A TYPICAL INDUSTRIAL SOURCE. Preprint, Univ. of Windsor, Windsor (Canada), Dept. of Chemical Engineering, 99p., 1974. 13 refs.

A preliminary study has developed a basis for a comprehensive approach to the control of odors from food processing industries. Identification of odorous compounds by gas chromatography and mass spectrometry is discussed. Gas chromatographic analysis of extracts of syrup fed to a flash dryer system indicates the presence of approximately 14 components, some or all of which may be odorous. A dynamic olfactometer was designed and constructed during the investigation. A number of modifications to lower odor levels in the stack effluent were suggested on the basis of several onsite inspections of the flash dryer system. A review of odor control technology provides an introduction to the design of a unit applicable to the drying operation. Eventually, it should be possible to identify all odorous components in effluent streams through a gas chromatographic-mass spectrometric analytical system.

57889

APTIC NO. 81518

Derouane, Alain and Ghert Verduyn

STUDY OF SOME FACTORS INFLUENCING THE POLLUTION OF THE AIR IN THE INTERIOR OF BUILDINGS. (*Etude de quelques facteurs influençant la pollution de l'air à l'intérieur des bâtiments*). Tribune CEBEDEAU (Centre Belge Etude Doc. Eaux), no. 373, Dec. 1974. 19 refs. (Presented at the International Conference CEBEDEAU-BELWA, 27th, 1974.) Translated from French, 15p.

Factors affecting the pollution of air in the interior of buildings are reviewed. Indoor-outdoor relationships are discussed for sulfur dioxide, carbon monoxide, nitrogen oxides, and particulates. Atmospheric conditions, particularly the wind direction and speed, influence the indoor/outdoor ratio of pollutants, especially for SO₂ and CO. Indoor sources of pollution include: home heating, kitchen activities, and the combustion of tobacco. Oil and coal heating systems can be important sources of SO₂, dust, and CO if badly adjusted or ill-maintained. Gas ranges and water heaters emit NO_x in addition to CO. Tests to determine the effect of tobacco smoke were conducted in a 50-cubic meter room with walls painted with latex. The following pollution levels were measured after three cigarettes were smoked: 1000 micrograms/cu m of aerosols, 7.5 ppm of CO, 70 ppm of NO_x, and a quinine index of 1450. Heavy hydrocarbon pollution decreased rapidly from the room as a result of fixation onto large particles which disappeared by sedimentation. Nitrogen oxides decreased more rapidly than CO, probably due to chemical reactions.

57890

APTIC NO. 73068

DeVine, J. C., Jr.

THE FORKED RIVER PROGRAM: A CAST STUDY IN SALTWATER COOLING. State of Maryland, Power Plant Siting Program and Atomic Energy Commission, Washington, D. C., Div. of Biomedical and Environmental Research, Cool. Tower Environ. Symp., College Park, Md., 1974, CONF-740302, p. 509-557, 1975. 19 refs. (March 4-6.)

A research program investigating the feasibility of using a natural-draft saltwater cooling tower system at a proposed nuclear generating station is described. Topics covered include: cooling tower drift measurements, the development of a

AIR POLLUTION ABSTRACTS, JUNE 1976

salt transport model, wind tunnel analyses to evaluate wake effects, plume rise observations, ambient salt level measurements, indigenous vegetation tolerances to salt, fogging and icing probabilities, and cooling tower blowdown effects. The salt transport model was used to derive a combination of mass drift rate and particle size distribution that is expected to maintain the off-site tower contribution of salt at 10% or less of background. The incremental increase in salt deposition is not expected to affect vegetation, structures, soils, or surface and ground waters in the region.

57891

APTIC NO. 76143

Eccleston, B. H. and R. W. Hurn

AMBIENT TEMPERATURE AND VEHICLE EMISSIONS (FINAL REPORT). Bureau of Mines, Bartlesville, Okla., Fuels Combustion Research Group, Office of Air and Waste Management Interagency Agreement OMSAPC-IAG-007, OMSAPC-IAG-D4-F402, and OMSAPC-IAG-D4-F533, Rept. EPA-460/3-74-028, 150p., Oct. 1974. 7 refs.

NTIS: PB 247692/AS

The effect of ambient temperature on exhaust emissions, as measured over the 1975 Federal Test Procedure, was investigated using 26 automobiles ranging from 1967 models to catalytic converter-equipped prototypes and cars powered by unconventional engines. Composite emissions of hydrocarbons, carbon monoxide, and nitrogen oxides were highest at 20 F. Hydrocarbons and CO were generally lowest at 75 F, and composite values were greatly influenced by cold start emissions. Composite NO_x emissions were generally lowest at 110 F and were relatively unaffected by ambient temperature. Diesel and stratified charge cars showed relatively low emissions and little temperature sensitivity. The reactivity of hydrocarbon and aldehyde emissions was unaffected by temperature and was lower for catalyst-equipped cars at all temperatures. (Author abstract modified)

57892

APTIC NO. 73064

Edmonds, Peter R., Haia K. Roffman, and Russell C. Maxwell

SOME TERRESTRIAL CONSIDERATIONS ASSOCIATED WITH COOLING-TOWER SYSTEMS FOR ELECTRIC POWER GENERATION. State of Maryland, Power Plant Siting Program and Atomic Energy Commission, Washington, D. C., Div. of Biomedical and Environmental Research, Cool. Tower Environ. Symp., College Park, Md., 1974, CONF-740302, p. 393-407, 1975. 16 refs. (March 4-6.)

Major terrestrial impacts associated with cooling-tower systems for power plant facilities are discussed in terms of the expected growth in electrical energy production by the year 2000. Major areas of consideration include land use, vegetation, soils, and ground and surface waters. The effects of wet evaporative cooling towers on vegetation are due to fog, drift, deposition, ice formation, and the combination of cooling tower plumes with other industrial effluents. The last factor can result in increased foliar uptake of gaseous and particulate effluents that may be toxic. Chloride deposition from saltwater cooling towers can produce injury to sensitive ornamental and crop vegetation. Maximum center-line chloride deposition rates of 1.2-17.4 lb/acre/mo are capable of causing tobacco damage within 1 mi from the point source. Calculations based on a 1000 MW power plant with a natural- or mechanical-draft cooling tower and a water circulation of 31.5 cu/sec show that increases in soil salinity of 0.004-0.13 m mho/cm at the root zone are possible. Significant water pollution can result from blowdown operations with cooling towers.

57893

APTIC NO. 82247

Edwards, C. A.

FACTORS THAT AFFECT THE PERSISTENCE OF PESTICIDES IN PLANTS AND SOILS. Pure Appl. Chem., 42(1-2):39-56, 1974. 105 refs.

EMISSION SOURCES

Chemical, plant, soil, and environmental factors affecting pesticide persistence are discussed. These are, firstly, the characteristics of the pesticide, including its stability either as parent compound or metabolites, its volatility, solubility, formulation, and the method and site of application. The environmental factors include temperature, precipitation, humidity, and wind. Characteristics influencing the persistence of pesticides in plants include the plant species involved, the nature of the harvested crop, the structure of the cuticle, the stage and rate of growth, and the general condition of the plant. Corresponding soil characteristics are the soil type and structure, its organic matter content, clay content, acidity or alkalinity, mineral ion content and degree of aggregation, and its microbial population. It is very difficult to make generalizations as to the relative importance of the different factors. Stability of the pesticide is of primary importance, particularly relative to its volatility and solubility. Solubility is probably of greatest importance in plants, followed by volatility; but in soils the order is reversed. Factors that are next in importance in plants are, in order of decreasing influence: the metabolic activity of the plant, the temperature regime, the amount of precipitation, and the amounts of wind and radiation. Factors of comparable importance in soil are the adsorption of pesticides onto clay or organic fractions, precipitation, temperature, and microbial activity. The nature of the crop and the method of application of the pesticide are of much less importance. Less important factors in soil include the hydrogen ion concentration and method of application. (Author abstract modified)

57894

APTIC NO. 82342

English, Thomas D.

RECAPITULATION OF ENVIRONMENTAL EXPOSURES. Commission of the European Communities, Luxembourg (Belgium), Health Protection Directorate; Environmental Protection Agency, Washington, D. C.; and World Health Organization, Geneva (Switzerland), Recent Adv. Assess. Health Eff. Environ. Pollut. Int. Symp. Proc., Paris, France, 1974, p. 401-408, 7 refs. (June 24-28.)

General techniques are described for the recapitulation of environmental exposure under a wide variety of topographic, climatic, and source emission distribution conditions. Various techniques are described for interpolation and extrapolation of available air pollutant measurements. These techniques include use of air quality models and construction of isoplethes. Annual wind rose and atmospheric stability conditions are analytically coupled with source emission data to estimate past spatial distributions of various pollutants. The use of dustfall data as an indicator of other pollutants such as suspended sulfates is examined statistically. Methods are described for calibrating computer based air pollution meteorological models to local topographic and climatic conditions. Techniques for determining the limits of precision of air pollutant exposure estimates are described. Measurements of air pollutant exposure for communities in the vicinity of Los Angeles constitute a data base upon the estimates of air pollution concentrations for a 10,000 sq mi area, the California South Coast Air Basin, are made. Annual average isoplethes for oxidant, nitrogen dioxide, and total suspended particulate are constructed for the time period from 1955 to 1972. Annual average isoplethes of the daily maximum hourly average concentrations which provide an estimate of the magnitude of peak air pollution exposures are discussed and spatial distribution of oxidant is discussed. Long-term trends for 4 communities are described. (Author abstract modified)

57895

APTIC NO. 79260

Forgo, L.

EFFECTS OF USING DRY ATMOSPHERIC COOLERS ON THE ENVIRONMENT. (Consequences pour l'environnement de l'utilisation des réfrigérants atmosphériques secs). Text in French. Bull. Assoc. Suisse Electric, 65(17):1291-1292, Aug. 1974. 1 ref.

57897

Observations and experience gained with natural-draft dry cooling towers at thermal power plants show that dry cooling towers offer practically unlimited possibilities for electricity generation without impairing the environment. Unlike wet cooling towers, dry cooling towers do not generate fog around them. The abatement of the noise generated by dry cooling towers is, however, a considerable problem.

57896

APTIC NO. 80355

Gerasimov, I. P.

SOURCES AND PROPAGATION OF ATMOSPHERIC CONTAMINATION. In: Chelovek, Obshchestvo i okruzhayushchaya sreda, Moscow, 1973. Translated from Russian by Joint Publications Research Service, Arlington, Va., p. 4-17, 1974. (In: Translations on Environmental Quality, no. 72.)

NTIS: JPRS 63715

The distance of propagation of a contaminant depends primarily on its lifetime in the air and meteorological conditions. A mathematical formula is given for the maximum concentration of air contaminants at the earth's surface for a group of stacks. The most important sources of the principal atmospheric contaminants are examined, including the burning of coals, shales, and petroleum and copper smelting as sulfur gas sources; internal combustion engines as carbon monoxide sources; and various sources of dust. Methods of dealing with air pollution in Soviet cities are described. They include tall stacks, use of meteorological data in planning industry locations, trees, conversion from solid and liquid fuel to gas, and monitoring. The contamination level in a number of major cities has been considerably reduced. Precise prediction of temperature changes in the atmosphere associated with an increase in the carbon dioxide content is impossible at present. Particles can exert a considerable influence on cloud formation processes. As a result of contamination of the upper troposphere by jet aircraft, there will be some decrease in the radiation balance and an intensification of the formation of precipitation in the air layers situated below. Water vapor from stratospheric aircraft can give a direct radiation effect, expressed in a warming at the earth's surface in regions with a maximum moisture content and cooling in the stratosphere. It is impossible at present to determine precisely the effect of the expected doubling of particulate aircraft exhausts entering the stratosphere.

57897

APTIC NO. 80017

Giaume, L. and G. Padoa

THE ROLE OF NITROGEN COMPOUNDS IN AIR POLLUTION. (Il ruolo dei composti dell'azoto nell'inquinamento atmosferico). Text in Italian. Ing. Chim. (Milan), 23(5):13-22, Oct. 23, 1974. 22 refs.

The presence of nitrogen dioxide and nitric oxide in the atmosphere is due to the formation of nitric oxide during the combustion of fuel-oil. Nitrogen dioxide irritated the respiratory tract and the eyes at a concentration of 13 ppm, produces congestion, edema, and bronchitis, and can cause death. Intermittent exposure to concentrations of 10 to 40 ppm can cause fibrosis and emphysema. Nitric oxide, although less toxic than nitrogen dioxide, will cause lividity if directly incorporated into hemoglobin in high enough concentrations. Nitrogen oxides also affect visibility and corrosion. Fuel-oil is used for vehicles and in industrial and domestic heating. There are two ways of controlling nitrogen oxide emissions in gasoline fumes: motor alterations which involve compression load, manifold suction, velocity, recirculation of discharged gases, and the addition of water vapor to reduce the formation of nitric oxide; or conversion of the discharge gas into its elements before discharge into the atmosphere. It is better to use a catalyst, to either accelerate the decomposition of the nitrogen oxide into its elements or to promote a reaction with a reducing agent. In the case of thermal and heating installations, it is necessary to act upon the air/combustion ratio since the formation of nitrogen oxides is favored by an excess of

oxygen, and on the high temperature which facilitates combustion. It is necessary to use a quantity of oxygen as close to the stoichiometric value as possible. Combustion can also proceed in two stages, the first without air, and the second with the air necessary to complete combustion. Tangential combustion is another means of reducing nitrogen oxide pollution from vehicles and thermal plants. The low temperature of the flame maintains nitrogen oxide emissions at a low level. All control systems are characterized by a low temperature parameter.

57898 APTIC NO. 76183

Gibbs, Larry L., Charles E. Zimmer, and John M. Zoller
SOURCE INVENTORY AND EMISSION FACTOR ANALYSIS. VOLUME I (FINAL REPORT). PEDCo-Environmental Specialists, Inc., Cincinnati, Ohio, Office of Air and Waste Management Contract 68-02-1350, Rept. EPA-450/3-75-062-a, 270p., Sept. 1974. 47 refs.

A Source Inventory and Emission Factor Analysis which is designed to determine the precision of emission inventories is described. The SIEFA program is based on and is compatible with the National Emissions Data System. Estimated precision values are calculated for each individual emission factor used in the NEDS. Methods for deriving the precision values are presented along with documentation for the basis of each assumption or estimate involved. The output from SIEFA presents precision in terms of the standard deviation of the estimated emissions and indicates the level of confidence that can be assigned to an emission inventory. Precision values are presented for both point sources and area sources.

57899 APTIC NO. 80210

Gnyp, A. W., G. P. Mathur, S. J. W. Price, C. C. St. Pierre, D. S. Smith, G. P. Underwood, and G. W. Wood

CLASSIFICATION, EVALUATION AND CONTROL OF INDUSTRIAL ODORS. Preprint, Univ. of Windsor (Canada), Dept. of Chemical Engineering, 65p., 1974. 43 refs.

Industrial odors are considered under three categories: classification of emissions, measurement, and control methods. The inventory of odorous emissions provides a tabular compilation of characteristic industrial pollutants. Odor descriptions, detectability, intensity, quality, and acceptability are discussed. The dynamic and static schemes used for the presentation of odors to human judges for odor measurement are compared. The panel technique is also discussed in terms of basic parameters. Potential methods of odor abatement are dispersion, process improvement, odor modification, and appropriate application of oxidation, absorption, or adsorption principles. (Author abstract modified)

57906 APTIC NO. 67126

Gottesman, Roy T.

CHEMISTRY AND TECHNOLOGY OF POLYVINYL CHLORIDE. American Chemical Society, Washington, D. C., Div. of Organic Coatings and Plastics Chemistry, 47p., 1974. 30 refs. (Presented at the American Chemical Society, Division of Organic Coating Plastics Chemistry, 50th Anniversary Symposium, Atlantic City, N. J., Sept. 11, 1974.)

A review is presented on the chemistry and technology of polyvinyl chloride (PVC) as well as copolymers of vinyl chloride with smaller amounts of other ethylene unsaturated monomers. Topics covered include: the history of the production of polyvinyl chloride, the manufacture of vinyl chloride monomer, polymerization of vinyl chloride, the physical and chemical characterization of polyvinyl chloride, classification of PVC resins, processing aids, impact modifiers, other additives, applications of PVC, and vinyl chloride toxicity in relation to occupational safety and health standards. Angiosarcomas in occupationally-exposed people working with the vinyl chloride monomer and vinyl chloride-induced liver an-

giosarcomas in experimental animals are discussed in relation to revised occupational safety and health standards for the suspected carcinogenic vinyl monomer.

57901 APTIC NO. 72658

Graefe, K.

TRAFFIC-RELATED CO MEASUREMENTS IN TUNNELS AND ON AN ELEVATED STREET IN HAMBURG. (Kraftverkehrsbezogene CO-Messungen in Tunneln und an einer Hochstrasse in Hamburg). Text in German. Schriftenreihe Ver.-Wasser-Boden-Lufthyg. (Berlin), vol. 42:109-117, 1974. 4 refs.

Measurements of traffic-generated carbon monoxide in tunnels and on special road sections in Hamburg are described. The daily variation of CO concentrations was closely related to that of the traffic density. The average CO concentration was highest between noon and 4 pm and lowest around 4 am. The highest average concentration was about 70 ppm, and peaks up to 110 ppm were recorded. While the maximum allowable concentrations were frequently exceeded, the exposure to such high concentrations is always of short duration. High CO concentrations, often exceeding the maximum allowable levels, were measured in an underpass in front traffic signals. The CO concentrations measured near elevated streets were rather low compared with those measured in narrow streets.

57902 APTIC NO. 79284

Habib, Yousuf H.

ODOR EMISSION SOURCES IN THE CHEMICAL AND PETROLEUM INDUSTRIES. In: Industrial Odor Technology Assessment. Paul N. Cheremisinoff and Richard A. Young (eds.), Ann Arbor, Mich., Ann Arbor Science Publishers, Inc., 1974 (?), Chapt. 12, p. 189-201. 2 refs.

Odor emissions and their control in the chemical and petroleum industries are reviewed. Major odorous pollutants generated by refineries include: sulfur dioxide, hydrogen sulfide, ammonia, hydrocarbons, organic acids, aldehydes, and mercaptans. Emissions generated by the inorganic chemical industry characteristically contain NH₃, aldehydes, SO₂, and H₂S. Common odorous components in emissions generated by the organic chemical industry include all of the above. The most common control techniques are process modification, catalytic or thermal combustion, diffusion, counteraction, absorption, and adsorption. Absorption and combustion are the most often used control techniques in the petroleum industry. The variety of processes and raw materials encountered in the chemical industry necessitates the selection of controls on an individual basis.

57903 APTIC NO. 82184

Haddad, R.

AIR POLLUTION PROBLEMS IN LATIN AMERICA. Commission of the European Communities, Luxembourg (Belgium), Health Protection Directorate; Environmental Protection Agency, Washington, D. C.; and World Health Organization, Geneva (Switzerland), Recent Adv. Assess. Health Eff. Environ. Pollut. Int. Symp. Proc., Paris, France, 1974, p. 451-456. (June 24-28.)

The Pan American Network of Air Pollution Monitoring Stations, started in 1967, now has 92 stations in 25 cities of 13 countries. It had collected over 300,000 data on particles and sulfur dioxide by December 1973. Some present monthly averages are three or more times higher than the reference levels. The main air pollution problems involve industrial combustion. A total of around 10,000,000 motor vehicles, combined with plenty of sunshine, cause a problem in some of the main cities. Home heating is seldom used, and only a small proportion of garbage is incinerated. An Under-Secretariat for Environmental Protection was established by Mexico in 1972, and by Argentina and Brazil in 1973. A few control programs are in operation at present, and some institutions have been

especially created for air pollution studies. Academic and short courses, as well as scholarships and travel grants, are employed to solve the main problem of air pollution programs; the scarcity of well-trained personnel. Research on air pollution is just starting in Latin America. Most of it deals with measurement of air pollutants, but some has been done on health effects, mainly in Chile and Mexico. (Author abstract modified)

57904

APTIC NO. 80071

Hata, H., A. Shibata, and T. Ikeda

BEHAVIOR OF SULFURIC ACID MIST AND ITS MEASUREMENT METHOD. (Ryusan misuto no kyodo to sokuteiho). Text in Japanese. Okayamaken Kogai Boshu Senta Kenkyu Hokoku (Bull. Okayama Prefect. Pollut. Control. Cent.), 2(1):41-56, 1974. 37 refs.

The behavior of sulfur trioxide at an emission source is reviewed in terms of the formation mechanism of SO₃, the volume of SO₃, the relationship with particulate concentrations, the formation of sulfuric acid, dewpoint, and the formation of acid mist in the flue. The isopropyl alcohol absorption method of Corbette, et al, the mist method by Listle, et al, and other source measurement methods are described with the advantages and disadvantages of each. The atmospheric oxidation of sulfur dioxide, the evaporation and condensation of H₂SO₄ during chemical processes, and the scattering and spraying of H₂SO₄ are discussed. The filter paper method and mist condensation method using a spiral tube to measure atmospheric SO₃ are described, with smoke measurement data. Atmospheric measurements of SO₃ are reviewed.

57905

APTIC NO. 81874

Ingalls, Melvin N. and Karl J. Springer

IN-USE HEAVY DUTY GASOLINE TRUCK EMISSIONS. PART II. SURVEILLANCE STUDY OF CONTROL EQUIPPED HEAVY-DUTY GASOLINE-POWERED VEHICLES (FINAL REPORT). Southwest Research Inst., San Antonio, Tex., Office of Air and Waste Management Contract EHS 70-113, Rept. EPA-460/3-73-002-b, AR 948, 439p., June 1974. 11 refs.

NTIS: PB 251679/AS

Exhaust emission tests were performed over a period of 2.5 yr on a fleet of 152 heavy duty 1970 and 1971 gasoline-powered trucks which were being used in the San Antonio area. Each truck received up to seven periodic tests for hydrocarbons, carbon monoxide, and nitrogen oxides using the chassis dynamometer version of the nine-mode engine dynamometer Federal Test Procedure. Additional tests were performed on 10 of these engines to obtain correlative data between the chassis and engine dynamometer procedures. About 70% of the fleet exhibited hydrocarbon emission levels below the Federal standards, while slightly less than 50% showed CO levels below the Federal standard. Nitrogen oxide emissions from about 65% of the trucks were below the proposed 1973 Federal standard. (Author abstract modified)

57906

APTIC NO. 84329

Jameson, Robert M. and Alexander Gakner

DEMAND FOR AIR POLLUTION CONTROLS IN THE POWER INDUSTRY. AICHE Symp. Ser., 70(137):56-63, 1974.

The present status and projected ability of the electric power industry for meeting air pollution regulations are reviewed. A total of 1010 coal- and oil-fired units are expected to require some form of sulfur emission control by 1975, either through the use of stack devices for sulfur dioxide removal or through the use of low-sulfur fuels. Although about 44 million tons of coal and 39 million barrels of oil consumed by electric utilities in 1969 contained 1% or less sulfur, about 59% of 2995 units surveyed could not meet the proposed sulfur limitations without flue gas cleaning devices. The National Power Survey projects an increase in electric utility fossil fuel demand of

about 20 million tons of coal and 45-50 million barrels of oil annually between 1970 and 1975, placing an increasingly strong demand on low-sulfur fuel availability. Alternatively, utilities must proceed with rapid programs of installing stack gas cleaning devices if they are to meet proposed sulfur oxide emission standards by 1975. Standards of performance for particulates, sulfur oxides, and nitrogen oxides are tabulated for new fossil-fired steam generators (construction commenced after August 17, 1971).

57907

APTIC NO. 72660

Kampf, W. -D.

SEVERAL YEARS OF CARBON MONOXIDE MEASUREMENTS ON THE EDGE OF A MAIN TRAFFIC ARTERY IN BERLIN. (Mehrjaehrige Kohlenmonoxidmessungen am Rande einer Hauptverkehrsstrasse in Berlin). Text in German. Schriftenreihe Ver.-Wasser-Boden-Lufthyg. (Berlin), vol. 42:101-108, 1974. 2 refs.

The results of systematic carbon monoxide concentration measurements conducted in a street with average traffic density in West Berlin for 6 years are presented. Air was sampled at 1.75 m height 8 m off the curb. The CO concentrations were highest during the morning and afternoon rush hours on workdays, in the late morning hours on Saturdays, and in the early afternoon hours on Sundays, corresponding to the pattern of the traffic density. The background value was between 3 and 5 ppm, and concentrations between 6 and 10 ppm were measured during periods of high traffic density. The CO concentrations decreased by about 50% on Sundays with traffic prohibition. While the CO concentrations measured are rather low, health hazards may arise from the long-term of both CO and concomitant pollutants, such as carcinogenic hydrocarbons and lead.

57908

APTIC NO. 70645

Kantner, A.

EMISSIONS OF DUST AND SULPHUR DIOXIDE FROM STEAM POWER PLANTS. (Emission von Staub und Schwefeldioxid aus Dampfkraftwerken). Text in German. VGB Kraftwerkstechnik, 54(10):668-672, 1974. 4 refs.

By means of questionnaires sent out in 1970 to all power plants of the Federal Republic of Germany belonging to the Association of Large Boiler Operators, the emission of particulates as well as the fuel consumption and the mean ash and sulfur content of fuels was determined and compared with data from earlier years. The results of this investigation are listed in tables. From a hard coal consumption in 1970 of 38,415,000 tons and a dust emission of 111,700 tons attributed to it, a specific dust emission per ton of hard coal (at an average heating value of 6300 kcal/kg) of 2.9 kg/ton is obtained. Assuming an average carbon dioxide content of the flue gas of 13.7%, the average dust concentration in the waste gas is calculated to amount to 304 mg/cu m. In a similar way the specific dust emission is calculated from a soft coal consumption in 1970 of 77,882,000 tons and a dust emission of 67,813 tons to be 0.87 kg/ton at an average heating value of 1800 kcal/kg. Assuming an average CO₂ concentration of 13% in the flue gas, an average dust concentration in the waste gas of roughly 200 mg/cu m is obtained. In another table the determined sulfur dioxide emission is listed taking into account the sulfur content of the fuel and the SO₂ binding by fly dust. For hard coal an average sulfur binding by fly dust of 5% agreed with reality. Seventy percent of the total SO₂ emissions were emitted in heights above 100 m. Power generation from fossil fuels rose between 1950 and 1970 from 100% to about 620%. It is paralleled by an increase of the total fuel consumption to roughly 320%. The SO₂ emission increased in a similar way. The increase slowed from 1967 on, due to the increasing use of gas.

Katayava, I. G. and S. F. Sapunov

APTIC NO. 81526

SANITARY-HYGIENIC CHARACTERISTICS OF THE FERRO-ALLOY DERIVATIVE OF VANADIUM AT THE CHUSOVA METALLURGICAL PLANT.

(Sanitarno-gigiyenicheskaya kharakteristika ferro-splavnogo proizvodstva vanadiya na chusovskom metallurgicheskome zavode). *Gigiena Truda i Prof. Zabolevaniya*, 18(10):37-39, Jan. 1974. 11 refs. Translated from Russian, 6p.

Dust and vanadium pentoxide levels in a ferrovanadium metallurgical plant were measured. The greatest dust concentrations were observed during grinding of vanadium slags and exceeded the maximum permissible concentration by many times. The vanadium pentoxide level was also several times higher than the MPC. Slag dust concentrations were decreased during annealing of the slag, although levels still exceeded the MPC by two to three times. Dust and vanadium pentoxide concentrations did not exceed the MPC during leaching and precipitation operations. Dust and vanadium pentoxide concentrations during the production of ferrovanadium were as high as 150.8 and 9.6 mg/cu m, respectively.

57910

Kerin, Danimir and Zarka Kerin

APTIC NO. 83419

DETERMINATION OF LEAD IN THE GROUND AND PLANTS IN THE AREA OF INDUSTRIAL EMISSIONS FROM THE MEZICA LEAD SMELTING PLANT.

(Določanje svinca v zemlji in gomoljnicah na področju industrijskih emisij topilnice svinca Zerjav (Mezica). *Text in Slovene. Nova Proizvod.*, 25(1-2):23-28, 1974. 21 refs.

The purpose of this study was to determine the amount of Pb in soil and root vegetables within a radius of 7500 m from the Mezica lead smelting plant. Spectrophotometry was used for the microanalysis. The cones and tree leaves contained 14-447 mg Pb/kg (dry), compared to 10 mg Pb/kg for non-polluted areas. Soil from the rural areas of Slovenia contains on an average 28 mg Pb/kg of complete and 1.64 mg aluminum-meltable Pb/kg. The soil around the smelting plant contains up to 5000 mg of complete, and up to 699 mg of Al-meltable Pb/kg. The amount of lead is higher in carrots than in potatoes. Analyses of these plants showed that the capacity to assimilate lead is extremely low in potatoes. This finding is important because it leads to avoiding supplying the rural population from the strongly contaminated areas of the Mezica valley with food grown there.

57911

Kettner, H.

APTIC NO. 72661

AIR HYGIENIC INFLUENCE OF UNDERGROUND PRIVATE GARAGES ON NEIGHBORING RESIDENTS.

(Lufthygienischer Einfluss von unterirdischen privaten Tiefgaragen auf die Anwohner). *Text in German. Schriftenreihe Ver. Wasser-Boden-Lufthyg.* (Berlin), vol. 42:119-124, 1974.

The carbon monoxide and lead concentrations in one street-level and one underground garage were measured in an attempt to assess the impact of such facilities on human health. The highest hourly mean CO concentration was 12 ppm in the street-level garage, and 16 ppm underground. The highest diurnal concentrations were 7.6 and 8.9 ppm, respectively, against the VDI (Verein Deutscher Ingenieure) standards of 45 ppm for 1 hr and 9 ppm for 24 hr. The daily average lead concentration was 1.12 micrograms/cu m in the street-level garage and 2.36 micrograms/cu m in the underground garage against a VDI standard of 3 micrograms/cu m. The findings indicate no health hazards due to the operation of the garages.

57912

Kilgroe, James D. and Maurice P. Schrag

APTIC NO. 72785

FUEL PREPARATION AND COMBINED FIRING PROCESS IN WASTE-TO-ENERGY TECHNOLOGY.

AIR POLLUTION ABSTRACTS, JUNE 1976

Preprint, Defense Advanced Research Projects Agency, 47p., 1974. 32 refs. (Presented at the Waste to Energy Conversion Systems for Military Base Utilization Workshop, Columbus, Ohio, Oct. 22-24, 1974.)

Various solid waste-energy recovery systems are analyzed in terms of their applicability to military installations. The energy recovery systems which have the greatest current application to such installations are small incinerators with heat recovery boilers and new or modified fossil fuel boilers capable of solid waste firing. Solid waste processing is probably going to be limited to size reduction and possibly ferrous metal and aluminum recovery. Combined firing in boilers designed for coal firing require varying degrees of size reduction and little or no classification. The firing of solid waste as a supplementary fuel with coal will result in reduced sulfur dioxide emissions, whereas the firing of solid waste with low sulfur oil may result in a modest increase in sulfur emissions. Nitrogen oxide emissions should remain unchanged or may be reduced as a result of lower combustion temperatures. Particulate emissions depend on the type of boiler, the firing technique, and the particulate emission control device employed. The solid waste fly ash probably does not exceed 20% of the total weight of the fired solid waste ash.

57913

Kim, Dong and Gyuir Cho

APTIC NO. 76561

A STUDY ON UNIFLOW SCAVENGING TYPE TWO-CYCLE ENGINE: 2ND REPORT. (Yunifuro sokishiki 2-saikuru enjin no kenkyu: Dai 2-ho). *Text in Japanese. Nippon Jidosha Kenkyujo Kenkyu Sokuho* (Res. Lett. Japan Automob. Inst.), no. 30:73-78, Sept. 1974.

Characteristics of a uniflow scavenging type single test engine with exhaust piston valve (scavenging stroke volume 300 cu cm; exhaust stroke volume 50 cu cm) were studied in the laboratory. Reduction of hydrocarbon concentrations in the exhaust gas was attempted by determining the optimum scavenging and exhaust systems for engine performance. The influence of the phase difference of the scavenging and exhaust ports on the composition of exhaust gas, and the influence of the scavenging port angle and exhaust port height were studied. The aforementioned influences were negligible for NO concentrations but affected HC concentrations greatly. With a decrease in load, HC and nitric oxide concentrations also decreased. Even for low-load driving conditions, at throttle openings of about 20%, fuel blow-through due to the scavenging process could not be ignored. At 20-25% load, HC concentrations were reduced to the level of 4-cycle engines, and NO concentrations were held to the level of schuele scavenging type engines. Full load performance of the engine was as follows: maximum power 20 ps; HC concentration 4000 ppm; NO concentration 200-300 ppm; minimum specific fuel consumption 300 g/ps-h.

57914

Kobayashi, T., S. Tsujimoto, and T. Ikezawa

APTIC NO. 73321

NITROGEN OXIDE EMISSIONS FROM IRON AND STEEL-MAKING OPERATIONS. (Seitetsu-jo kanren shisetsu no NOx haishutsu keisu). *Text in Japanese. Taiki Osen Kenkyu* (J. Japan. Soc. Air Pollution), 9(2):413, Nov. 1974. (Presented at the National Air Pollution Research Conference, Nov. 6-8, 1974, 15th, Chiba, Japan, Paper 264.)

The nitrogen oxides emission characteristics from steel mills were studied by measuring the NOx emission from various types of furnaces. The NOx concentration (ppm) and NOx emission quantity per input calorific value (Ncu m/1000000 kcal) were 117-206 and 0.816-1.02 for a sintering furnace, 285-635 and 0.544-1.02 for a coke oven, 86-153 and 0.229-0.465 for a scaling furnace, 34-133 and 0.250-1.65 for a pellet sintering furnace, 6-75 and 0.013-0.130 for a blast furnace, and 17-163 and 0.046-0.251 for a multi-fuel combustion furnace. The plottings of NOx emission quantity vs. input calorific value indicated that the furnaces were classified into three groups.

EMISSION SOURCES

57919

Higher NO_x emissions by the sintering furnace and coke oven are attributable to the formation of fuel nitric oxide from nitrogen contained in coke fuel and the preheating of fuel gas and air at high temperatures. The lower NO_x emissions by blast furnaces is attributed to the specific structures of the combustion chamber and burner and the absence of preheating of fuel gas and air. The NO_x emissions of scaling and pellet sintering furnaces is similar to that of a heavy oil boiler, since the burner structure and combustion temperature are similar, though the furnace structure is different. The NO_x emissions by a rotary kiln and electric furnaces were also measured, and indicated a fairly high concentration of NO.

57915

APTIC NO. 80339

Kobayashi, T., S. Tsujimoto, and T. Ikezawa

NITROGEN OXIDES EMISSION COEFFICIENT IN STATIONARY POLLUTION SOURCES. (*Kotei osengen ni okeru chisso sankabutsu haishutsu keisu*). Text in Japanese. Hyogo-ken Kogai Kenkyusho Kenkyu Hokoku (Rept. Public Nuisance Res. Inst., Hyogo Prefect.), no. 6:36-42, 1974. 8 refs.

The emission coefficient of nitrogen oxides from steel mills in Hyogo Prefecture was calculated. There were 25 boilers, 3 sintering furnaces, 3 pellet sintering furnaces, 4 coking furnaces, 6 heating furnaces, 2 blast furnace heated wind furnaces, 1 converter, and 1 electric furnace. Nitrogen oxides were measured using both the PDS method and the chemical luminescence method. After measuring NO_x from boilers and from equipment used at steel mills, the relationship between the heavy oil used for boilers and emissions of NO_x was expressed through a regression formula. The equipment at steel mills was divided into three groups, comparing them with boilers, and emission characteristics of each group were analyzed. Factors causing nitric oxide generation were examined, including the temperature of the combustion chamber, preheating of fuel and combustion air, the shape of the burner, and kinds of fuel. Sintering furnaces and coke furnaces were classed in Group I, heating furnaces and pellet sintering furnaces in Group II, and blast furnace heated wind furnaces and gas combustion boilers in Group III.

57916

APTIC NO. 70802

Kohayakawa, Takashi and Masaru Kokokawa

SOME KNOWLEDGE ABOUT AIR POLLUTION BY AUTOMOBILE EXHAUST EMISSION. (*Jidosha ni yoru taiki osen ni tsuite no nisan no shiken*). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 9(2):499, Nov. 1974. (Presented at the National Air Pollution Research Conference, Nov. 6-8, 1974, 15th, Chiba, Japan, Paper 345.)

The present automotive exhaust emission control standard requires the reduction of carbon monoxide, hydrocarbons, and nitrogen oxides emission to 1/10 their present level without regard to pollution status or scientific understanding of the photochemical smog formation mechanism. The ratio of HC to NO_x is an important factor in photochemical smog formation, and smog is more likely to occur at an HC/NO_x ratio of 1. In the cases of Tokyo and Osaka, thy investigation showed that the HC/NO_x ratio approached 1 if HC concentration was reduced. Therefore, a reduction of NO_x is more effective for the prevention of photochemical smog formation. The NO_x in Tokyo is about 1/7 of that in Los Angeles, and therefore a reduction to 1/2 of the present level is sufficient.

57917

APTIC NO. 83256

Koide, K.iko, Yuji Tsuruta, Keiji Sugimura, Kazunori Ueno, Masahiro Kawakami, and Osamu Imamura

SO₂ CONCENTRATION AND VOLCANIC ASHES AROUND ACTIVE MT. ASO. (*Katsudoki ni okeru asokazan shuhen no SO₂ nodo to kobairyo ni suite*). Text in Japanese. Kumamoto-ken Eisei Kogai Kenkyusho-ho (Annu. Rep. Kumamoto Prefect. Inst. Public Health Pol., vol. 1974:38-42, 1974.

The sulfur dioxide concentration and the quantity of dustfall in the area surrounding Mt. Aso volcano during its active period were measured. In the extensive caldera of the multiple-mouthed active volcano, there are several towns engaged in farming, touring, sericulture and stock raising. These towns have been victimized each time the volcano became active. The investigation was conducted during September through December of 1974 at six selected points using automatic analyzers to measure SO₂ by the lead dioxide method and dustfall by the deposit gage method according to the 1974 environmental air investigation and measuring guidelines of the Environmental Agency. The SO₂ at the top of the mountain was 1.81 to 3.12 mg/l sq cm/day, the same as at Yashiro City, which had one of the highest rates of the six selected locations. At the other five locations the SO₂ concentration was the same as in unpolluted areas, due to the difference of 160-840 m height above sea level between the crater and the measuring points. Dust fall at the nearest point from the crater was 6400 ton/sq km/month; at the other five points there are maxima of 382, 144, 128, 128 and 114 ton/sq km/month, 15 to 900 times the values at the Arao industrial area of Kumamoto Prefecture.

57918

APTIC NO. 76088

Liljedahl, D. R. and J. L. Terry

A STUDY OF EMISSIONS FROM 1967-1974 LIGHT-DUTY VEHICLES IN DENVER, HOUSTON, AND DETROIT. Automotive Testing Labs., Inc., Aurora, Colo., Office of Air and Waste Management Contract 68-03-0388, Rept. EPA-460/3-74-015, 438p., Oct. 1974.

NTIS: PB 245836/AS

Exhaust emission tests were performed on 540 vehicles (1967-1974 model year) operating in Denver, Houston, and Detroit. Each vehicle was examined in an as-received condition using the 1975 Federal Test Procedure. Evaporative emission tests were also performed on 20 1973 model-year vehicles in the Denver area. A variety of additional exhaust emission tests under different vehicle operating conditions were also performed. Model emissions data were developed from 75 of the 1972, 1973, and 1974 model-year vehicles in each state using the Surveillance Driving Sequence and steady state testing procedures. Mean hydrocarbon, carbon monoxide, and nitrogen oxide emissions from vehicles in the Denver area were: 6.17, 99.0, and 2.87 g/mi, respectively. Vehicles in the Houston area showed mean values of 5.20, 70.7, and 5.39 g/mi, respectively; while vehicles in the Detroit area showed mean levels of 5.85, 66.8, and 5.31 g/mi, respectively.

57919

APTIC NO. 79239

Linnstaedter, E. E.

STACK GAS EMISSIONS FROM OCEANGOING SHIPS: REGULATIONS, SIGNIFICANCE, AND CONTROL METHODS (TECHNICAL REPORT). National Maritime Research Center, Galveston, Tex., Pollution Control Section, Maritime Administration Contract MA-6562, Rept. NMRC-272-20200-R1, MA-RD-900-75010, 31p., July 1974. 32 refs.

NTIS: COM-74-11635

Stack gas emissions from oceangoing ships are discussed in terms of regulations for their control, their significance in relation to other air pollution sources, and present emission control technology. No uniformity exists in the application of stack gas emission regulations to ships since no central agency coordinates the activities of regulatory agencies with power to impose laws on the shipping industry. Oceangoing ships are only a small contributor to macro-scale air pollution and contribute less than 1% of the pollutants from all sources in the United States. Black smoke on startup, upset conditions, and soot blowing operations are mostly nuisance problems. No special marine pollution control equipment is available for marine steam power systems, although automatic combustion control systems are capable of adequately controlling ship emissions with the exception of sulfur dioxide which is a function of the quantity of sulfur in the fuel being burned.

57920

Littman, Fred E.

REGIONAL AIR POLLUTION STUDY POINT SOURCE METHODOLOGY AND INVENTORY (FINAL REPORT). Rockwell International, Thousand Oaks, Calif., Office of Air and Waste Management Contract 68-02-1081, Task 16, Rept. EPA-450/3-74-054, 49p., Oct. 1974. 9 refs. NTIS: PB 246638/AS

Methodology employed in the St. Louis Regional Air Pollution Inventory is described. A two level approach is used: the measurement of hourly emissions or emission-related data for principal sources which are defined as those emitting in excess of 1000 tons of pollutants per year and a simulation of hourly emissions for smaller sources based on yearly outputs and appropriate information on the consumption or production cycle. Pollutants of interest include: sulfur dioxide, carbon monoxide, particulate matter, hydrocarbons, and oxides of nitrogen. Emission data acquisition and handling procedures are described along with the inventory acquisition schedule.

57921

Logan, T. J., R. M. Felder, and J. K. Ferrell

EXPERIMENTAL INVESTIGATION OF ISOKINETIC AND ANISOKINETIC SAMPLING OF PARTICULATES IN STACK GASES. *AIChE Symp. Ser.*, 70(137):310-316, 1974. 4 refs.

Parameters affecting the calculation of the true particle concentration from data obtained during anisokinetic sampling of particulates in stack gases were investigated. Particulate matter of known composition was fed into a stack, gas samples were withdrawn at various sampler probe velocities, and particulate concentrations for these samples were measured. The validity of a formula derived by Badzioch for the true particulate concentration in the stack as a function of the sampled concentration and the ratio of stack gas velocity to probe velocity was confirmed. However, an existing semiempirical correlation for the inertial parameter in the formula was not found reliable. The experimental determination of this parameter for a given sampler probe geometry and particulate composition is recommended. (Author abstract modified)

57922

Lymburner, D. B.

ENVIRONMENTAL CONTAMINANTS INVENTORY STUDY NO. 2. THE PRODUCTION, USE AND DISTRIBUTION OF CADMIUM IN CANADA. Canada Centre for Inland Waters, Burlington (Canada), Inland Waters Directorate, Contract KL327-4-8069, Rept. Series no. 39, 71p., 1974. 108 refs.

Information is given on the occurrence, characteristics, production processes, global economic significance, and major uses of cadmium. Toxicity and environmental pollution are discussed. The structure of cadmium production and use in Canada is analyzed using quantitative data on production and consumption in terms of end use. Cadmium consumption in Canada bears little relation to its production in terms of quantity due to the large volume of exports. Cadmium compounds and their uses are listed. Cadmium emissions from fungicides are based on an estimated loss of 2% during application. Products containing cadmium as a contaminant include superphosphate fertilizers, rubber tires, motor oils, and tobacco. It is estimated that 52% of cadmium loss to air occurs during the incineration and disposal or reclamation of products containing cadmium. Due to the nature of the products and the main uses of cadmium in Canada, no recovery of cadmium is made nor is there any indication of secondary cadmium production from scrap recycling.

57923

Lyon, W. S., N. E. Bolton, J. F. Emery, and D. H. Klein

INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS OF EFFLUENTS FROM COAL FIRED POWER PLANTS. Energy Research and Development Administration, Washington, D. C., Div. of Biomedical and Environmental Research and the American Nuclear Society, Isotopes and Radiation Div., Nucl. Methods Environ. Res. Conf., Columbia, Mo., 1974, p. 376-384. 7 refs. (July 29-31.)

NTIS: CONF-740701

Problems associated with the sampling of coal, slag, and fly ash at the Allen Steam Plant in Memphis, Tennessee are reviewed in relation to their effect on the accuracy of subsequent trace element determinations. Sources of sample contamination include: the preparation of impinger solutions under less than pollution-free conditions, inlet tube soiling by dirty glove hands during an attempt to speed up the air flow, the presence of impurities in aluminum thimbles, the clogging of thimble pores by very fine particles which results in the enhancement of large particles in loose sample material, and impurities inherent in Gelman glass filters used for sampling.

57924

Martin, A. R., D. T. Feal, and L. M. Anstey

A STUDY OF EMISSIONS FROM 1967-1974 LIGHT-DUTY VEHICLES IN NEWARK, NEW JERSEY (FINAL REPORT). General Environments Corp., Springfield, Va., Office of Air and Waste Management Contract 68-03-0389, Rept. EPA-460/3-74-014, 206p., Oct. 1974. 2 refs.

NTIS: PB 248957/AS

Exhaust emission tests (1975 Federal Test Procedure) were conducted on 180 privately owned light-duty vehicles (1967-1974 model years) from the metropolitan Newark, New Jersey area. Compliance with the 1972 Federal emission standards for hydrocarbons and carbon monoxide was achieved by 21.7% of vehicles tested, and compliance with the 1973/74 Federal standards was achieved in 10% of the cases. Only one vehicle was able to meet the 1975 Federal standards. A continuing decrease in mass emission rates was observed as the vehicle model years progressed from 1967 through 1974. When contrasted with current emission rates for 1967 model year vehicles, emission rates for 1974 model year vehicles were lower by 72% for hydrocarbons, 73% for carbon monoxide, and 36% for nitrogen oxides. Aldehyde emissions from 1974 model year vehicles were 37% lower than those from 1972 model year vehicles.

57925

Minamitani, H., C. Machida, K. Kawashima, Y. Takagi, M. Oshima, M. Hayashiguchi, Y. Iwamiya, and K. Nakamura

COMPOSITION OF AUTOMOBILE GASOLINE AND HYDROCARBON COMPOSITION IN EXHAUST GAS. (*Jidosha gasorin sosei to haikigasu chu no tankasuiso sosei*). Text in Japanese. Maruzen Sekiyu Giho (Maruzen Oil Tech. Rept.), 19, p. 29-37, 1974.

Using fuel oils with different compositions combined with paraffins, aromatics, and olefins, the effect of fuel oil composition on automobile exhaust and on the degree of photochemical reaction was studied. Even in the case of a 100% paraffin fuel oil, the concentration of aromatic hydrocarbons in the exhaust gas is almost same as for olefin-added fuel oil. The concentration of aromatic hydrocarbons in the exhaust gas increases with the amount of benzene in the fuel oil. The concentration of olefin in the exhaust gas increases slightly with the amount of DIB in the fuel oil. The effect on photochemical reactions of using a 100% paraffin fuel oil is almost the same as for olefin-added fuel oil.

EMISSION SOURCES

57931

57926

APTIC NO. 88230

Mosier, Stanley A. and Richard Roberts

LOW-POWER TURBOPROPULSION COMBUSTOR EXHAUST EMISSIONS. VOLUME III. ANALYSIS. United Aircraft Corp., West Palm Beach Fla., Pratt and Whitney Aircraft Div., Air Force Contract F33615-71-C-1870, Proj. 3066, Task 306605, Rept. AFAPL-TR-73-36, 59p., July 1974. 7 refs.

NTIS, DDC: AD784900

A generalized combustor computer program was used to predict exhaust emission concentrations from five different gas turbine engine combustors; predictions were compared with measured data. Generally good prediction accuracy was demonstrated. Adjustments to improve the prediction capability of the model were implemented. Further analysis of previously obtained high pressure combustor test data was also accomplished. A phenomenological model for the demonstration combustor was developed using these analyses and those previously accomplished for low pressure data. A variable geometry premixing burner was designed for reducing concentrations of exhaust emissions over the operating range from part to full power. It includes a novel method of varying combustor airflow distribution. (Author abstract modified)

57927

APTIC NO. 76283

Mutko, Barbara

QUANTITATIVE DETERMINATION OF NITROGEN OXIDES IN WASTE GASES EMITTED IN NITRIC ACID PRODUCTION. (Oznaczanie zawartosci tlenkow azotu w gazach emulowanych do atmosfery podczas produkcji kwasu azotowego). Text in Polish. Ochrona Powietrza (Warsaw), 8(2):52-55, April 1974. 9 refs.

A procedure for determination of nitrogen oxide emitted to the atmosphere by nitric acid production plants that satisfies the requirements of the state regulation Protection of Atmosphere from Pollution, dated April 21, 1966, is presented. The method is based on the use of an absorbing solution consisting of a mixture of hydrogen peroxide and sulfuric acid which then reacts with phenoldisulfonic acid in order to produce a solution suitable for colorimetric analysis at the wavelength of 400 nm. Lists or required equipment and basic chemicals are given. Procedures for preparation of required solutions are specified in detail. Sampling, calibration, measurement and conversion of results to an equivalent concentration of nitric anhydride are described. The method allows one to determine the equivalent N2O5 concentrations in the range from 2.5 to 2000 mg/cu m, which is suitable for application to emissions from nitric acid production. Additional thinning of solution by the absorbent allows extension of the range of measurable concentrations to 20 g/cu m.

57928

APTIC NO. 73542

Myers, P. S.

TO DRIVE OR BREATHE? Preprint, American Inst. of Physics, New York, 32p., 1974. 7 refs. (Presented at the American Institute of Physics Conference Proceedings, 1974.)

Energy systems for transportation are reviewed in terms of their impact on air pollution and energy consumption. Topics discussed include: the comparative energy consumption of buses, aircraft, automobiles, and rail transport; the human health effects of sulfur dioxide, sulfuric acid, particulates, nitrogen dioxide, hydrocarbons, ozone, and carbon monoxide; methods for controlling automobile emissions; and alternate power plants for automobiles such as steam, diesel, stratified charge, and rotary engines. Air pollution from transportation does not seem to be at levels that adversely affect healthy individuals, though present pollution is capable of endangering the life of marginally healthy people. On a long-term basis, however, present pollution levels are high enough to warrant pollution control efforts. Among alternatives to the internal combustion engine, the stratified charge engine appears to be

the most advantageous in terms of controlling emissions without serious fuel penalties.

57929

APTIC NO. 88239

Okhotskii, V. B. and A. S. Gorbik

DUST ENTRAINMENT IN THE ACID-CONVERTER PROCESS. (Nekotoryye osobennosti pyleunosa v kislorodno-konvertornom protsesse). Text in Russian. Izv. Vysishk Uchebn. Zavedeni Chernaya Met., 10:48-50, 1974. 8 refs.

The interdependence of dust content in deposited gases and carbon content in metal was studied in the case when the tuyere was over the level of the bath for the following three main periods in the oxygen converter process: intensive oxidizing of silicon and manganese; intensive burning of carbon in the presence of foamy slag; intensive burning of carbon when the slag was coagulated. Dependence of dust content on the foamy slag level is graphed. Dust content decreased when carbon concentration decreased; when the carbon concentration was the same during all three periods, the dust content was the same in the first two periods and higher in the third. In two out of three periods when the foamy slag level was increased from 1.5 m to 2.5 m, the dust content decreased; further increase of the slag level was not effective. For slag-free blasting, the dust content increased when the slag level was raised. The speed of burning carbon influenced the dust content only for slag-free blasting.

57930

APTIC NO. 76570

Oyama, M., A. Moriyama, H. Miyazato, and H. Sakagawa

EXAMPLES ON THE ACID-SMUT FALLOUT.

(Ashidosumatto koka jirei ni tsuite). Text in Japanese. Okinawa-ken Kogi Eisei Kenkyusho-bo. (Okinawa Prefect. Res. Inst. Pollut. Health), no. 8:32-33, 1974.

The acid-smut fallout that occurred in October 1974 in Okinawa Prefecture is described. The leaves of plants at the accident site showed 2 to 3 mm holes whose edges indicated the ashed condition, a typical observation after the sulfuric acid mist accident. Several corrosion spots were also observed on galvanized iron roofs. The suspected source was the main chimney of the Okinawa Petroleum Co., emitting sulfur dioxide at the rate of 420 N cu m/hr (12 ton/hr). The damage was observed at the western side of the main chimney. Following the reported damage, the cleaning of the main chimney was done, yielding more than 10 drums full acid-smut, more than 66% of which had particle sizes greater than 149 microns. The collected acid-smut was analyzed. The sulfuric acid content in the acid-smut was 30%. There was 6% iron and 60 ppm nickel in the acid-smut, as well as vanadium and copper (II).

57931

APTIC NO. 88152

Patterson, C. and D. Settle

CONTRIBUTION OF LEAD VIA AEROSOL DEPOSITION TO THE SOUTHERN CALIFORNIA BIGHT. J. Rech. Atmospheriques, 8(3-4):957-960, July-Dec. 1974. 6 refs. (Presented at the International Symposium on the Chemistry of Sea/Air Particulate Exchange Processes, Nice, France, Oct. 4-10, 1973.)

Inputs and outputs of lead are used to construct a mass balance model for the Southern California Bight. The input for aerosol deposition of Pb to the bight is determined by measuring depositions on an offshore island on the seaward periphery of the study area and on the coast of the study area. Lead isotopic compositions are determined for coastal waters, open ocean, aerosol deposition and sewage effluent leads. Aerosol deposition Pb accounts for much of the Pb introduced to the oceans on a world scale. Differences in isotopic composition of industrial input leads and sea water leads are used to locate the source of industrial pollution. (Author abstract modified)

57932

APTIC NO. 76181

Patterson, R. M., R. D. Wang, and F. A. Record

AIRPORT EMISSION INVENTORY METHODOLOGY (FINAL REPORT). GCA Corp., Bedford, Mass., GCA/Technology Div., Office of Air and Waste Management Contract 68-02-0041, Task 18, Rept. EPA-450/3-75-048, 109p., Dec. 1974. 11 refs.

NTIS: PB 247762/AS

A method for performing emission inventories at airports is presented, with particular emphasis on airports in the St. Louis Air Quality Control Region. The basic method by which emissions are estimated involves constructing matrices and vectors of the applicable data and then adding and multiplying these matrices and vectors so that the result is hourly emissions for each of the grid elements involved. Submethodologies corresponding to municipal, military, and civilian airports are also described. Data collection and handling requirements are specified, and data for the airports in the St. Louis AQCR are presented. Ground service vehicle emission factors for carbon monoxide, hydrocarbons, nitrogen oxides, and particulates are tabulated along with composite emission factors for hydrocarbons, CO, NOx, sulfur dioxide, and particulates from air taxi, general aviation, and military aircraft.

57933

APTIC NO. 82290

Pebler, A. R.

CONCENTRATION OF SULFUR COMPOUNDS IN EQUILIBRATED FUEL/AIR COMBUSTION MIXTURES. Combustion, 46(2):21-23, Aug. 1974.

The concentration of sulfur compounds in equilibrated fuel/air combustion mixtures was computed at temperatures between 300 and 2500 K and air/fuel ratios ranging from 10% excess fuel to 100% excess air. Prevalent compounds included hydrogen sulfide, carbonyl sulfide, sulfur, sulfur dioxide, sulfur trioxide, and sulfuric acid, the latter present in the gaseous and liquid state. In excess oxygen mixtures, the predominant sulfur compounds were H₂SO₄ (liquid and gaseous) below 300 K; SO₃ between 500 and 1000 K; and SO₂ above 1000 K. The most stable compound in excess fuel mixtures below 1400 K was H₂S; and at higher temperatures, SO₂. Sulfur trioxide and H₂SO₄ were practically nonexistent in stoichiometric and sub-stoichiometric combustion gases. (Author abstract)

57934

APTIC NO. 80175

Fenney, D. G., J. P. Bederka, Jr., J. S. McLellan, W. F. Coello, Z. A. Saleem, and M. A. Q. Khan

ECOLOGICAL AND HEALTH EFFECTS OF POLLUTANTS IN AUTOMOBILE EXHAUST. In: *Survival in Toxic Environments*. M. A. Q. Khan and John P. Bederka, Jr. (eds.), New York, Academic Press, 1974, p. 497-498. 1 ref.

Atmospheric concentrations of air pollution from automobile exhausts are summarized. Approximately 200 million tons of man-made pollutants are released into the air over the United States every year. Automobiles contribute about half of these pollutants which include: carbon monoxide, 64,000,000 tons; hydrocarbons, 17,000,000 tons; nitrogen oxides, 8,000,000 tons; sulfur oxides, 800,000 tons, and particulate matter 1,200,000 tons. The particulates include 220,000 tons of lead released from the burning of 75 billion gallons of gasoline each year. About 95% of the CO is removed from the air by soil microorganisms, but Pb is not metabolically degraded by living organisms. The overall annual increase of atmospheric Pb is 7%, but can reach up to 60%. The ambient air content of Pb in cities in the United States and abroad is tabulated.

57935

APTIC NO. 79907

Pitul, Robert P. and Robert Rabin

PROGRAM PLAN FOR ENVIRONMENTAL EFFECTS OF ENERGY (FINAL REPORT). MITRE Corp., McLean, Va., National Science Foundation Contract 74-

SP-0827, Proj. 1700, Rept. MTR-6726, 300p., July 1974. 47 refs.

NTIS: PB-235 115

The National Science Foundation's initial Five Year Program Plan for the Environmental Effects of Energy is presented. It consists of a basic program for five energy sources: coal, oil and gas, oil shale, geothermal, and solar. Air pollution is discussed specifically in reference to oil conversion and transportation and oil shale. Program planning and evaluation needs are also identified. (Author abstract modified)

57936

APTIC NO. 79280

Polhemus, John

RUBBER, PLASTICS AND GLASS INDUSTRIES ODORS.

In: *Industrial Odor Technology Assessment*. Paul P. Cheremisinoff and Richard A. Young (eds.), Ann Arbor, Mich., Ann Arbor Science Publishers, Inc., 1974 (7), Chapt. 8, p. 101-115. 41 refs.

Odor problems associated with rubber, plastics, and glass industries are reviewed. Odors from the rubber and plastics industry commonly fall into the following groups: nitro compounds (amines and oxides), sulfur oxides, plasticizers, solvents, and phenols, and other alcohols. Operations in the rubber and plastics industry which generate odors include: compounding and formulation, material handling, banbury, mills, curing and vulcanizing, and forming (extruders and presses). Glass industry odors are usually associated with furnace products, mold lubrication maintenance, and coating operations. The odorous emissions include: sulfur oxides, nitrogen oxides, and halide gases. Odors generated by support operations in the glass industry include hydrofluoric acid which is used for glass etching and aromatics which are used as carriers in Teflon coating.

57937

APTIC NO. 74699

Preston, A.

MARINE POLLUTION. *Inst. of Marine Engineers, Eff. IMCO Pollut. Regul. Shipp. Conf.*, 1974, p. 1-5. 25 refs. (Dec. 5.)

The effect of air pollution on marine pollution is discussed. Lead poses special problems since a great deal enters the ocean via the atmosphere through the use of antiknock additives in gasoline, such as tetraethyl lead. Extensive areas of the mixed layer of the ocean contain several times their normal Pb content. Much of this Pb reaches the sediments; some builds up in animal tissue. Chlorinated hydrocarbons which enter the marine environment may be highly toxic, persistent, and bioaccumulated. They are widespread atmospheric contaminants, principally because of their presence in pesticides.

57938

APTIC NO. 81977

Pazenny, Alexander A. P. and Irving J. Russell

AN ANALYSIS OF AIR PARTICULATES GENERATED IN THE BOSTON SUMNER TUNNEL AND ENVIRONS. Boston Coll., Chestnut Hill, Mass., Dept. of Chemistry, Atomic Energy Commission Contract AT(11-1)-1015, 14p., June 1974. 8 refs.

A series of air particulate samples was collected on the 1.1 mi long Boston Sumner Tunnel on August 31, 1973. Analysis of the samples by neutron activation and atomic absorption yielded data for 18 elements. Those definitely correlated with automotive activity were lead and bromine. Copper, cobalt, and manganese showed a negative correlation. No confirmation of a correlation for zinc and antimony was obtained. A comparison of the Pb data with that obtained in 1962 led to a supposition that ventilation capacity had been somewhat increased since 1962. This was confirmed by tunnel authorities. It is probable that the automobile is responsible indirectly, because of its dynamic resuspension action, for a much higher percentage of the total particulate burden in city streets than noted on the basis of direct automotive emissions. (Author abstract modified)

EMISSION SOURCES

57944

57939

APTIC NO. 79259

Remeyen, J., J. Van Dievort, and G. Oplatka

ECONOMIC COMPARISON OF VARIOUS COOLING SYSTEMS AS A FUNCTION OF ENVIRONMENTAL CONSTRAINTS. (*Comparaison économique des différents systèmes de refroidissement en fonction des contraintes d'environnement*). Text in French. Bull. Assoc. Suisse Electric, 65(17):1294-1299, Aug. 1974.

Different cooling systems for the thermoelectric power plants are compared with respect to their economy and the environmental constraints. Limitation of the thermal pollution and of the environmental impacts in general require considerable additional investments. Wet type cooling towers of sufficient height, and equipped with droplet separators, generate clouds, which is environmentally acceptable. The elimination of such vapor plumes would be prohibitively expensive. The installation of droplet separators in cooling towers with natural draft, using fresh water, amounts to 1 to 3% of the total investment, and to 8% for cooling towers using brackish water. The rate of water entrainment from natural-draft cooling towers with droplet separators amounts to 0.013-0.002%, but is substantially higher in the case of forced-draft cooling towers. Low wet cooling with forced draft towers may generate fog in particularly susceptible regions, and therefore, they may have to be replaced by natural-draft wet cooling towers for large-capacity power plants, or by dry cooling towers with direct condensation for power plants of small capacity.

57940

APTIC NO. 80252

Reuschl, W.

ENVIRONMENTAL PROBLEMS OF ENERGY SUPPLY IN BREWERIES. (*Probleme des Umweltschutzes bei der Energieversorgung der Brauerei*). Text in German. Brauwelt, 114(62):1311-1315, Aug. 1974.

Air pollution and noise problems in the West German brewery industry are discussed with regard to the Federal Clean Air Maintenance Act. According to the provisions of this act, breweries are subject to simplified authorization procedure concerning construction and operation. In breweries, air pollution is generated primarily in heating processes, due to the use of sulfur-containing oil. In highly polluted areas, breweries may be required to keep enough low-sulfur fuel oil in reserve for one week of operation. In view of the small plant size, most breweries will solve their sulfur dioxide emission problems by the use of low-sulfur fuel rather than by waste gas desulfurization. There is practically no possibility to abate such emissions by modifications in the brewing technology.

57941

APTIC NO. 81872

Savoie, E. W. and M. Kormanik

DETERMINATION OF PARTICULATE EMISSION FACTORS FOR BOILERS AND INCINERATORS BRONX AND MANHATTAN (FINAL REPORT). *Environmental Conservation Research, Inc., Albany, N. Y., Office of Air and Waste Management Contract 68-02-1070, Rept. EPA-450/3-76-008, 114p., Feb. 1974. 1 ref.*

NTIS: PB 251574/AS

Particulate emission factors for residual oil-fired boilers and flue fed incinerators in apartment houses in South Bronx and Upper Manhattan, New York City were calculated. A total of 25 boilers with maximum burning rates ranging from 14-100 gallons of flue/hr and 21 incinerators with charging rates from 84-383 lb/hr were tested. Tests were conducted using the particulate sampling train developed by the Environmental Protection Agency. The boiler emission factors on a dry filter and total basis, respectively, were 24.0 and 33.5 lb of particulate/1000 gallons of low sulfur residual fuel oil. The incinerator emission factors (dry filter basis) were 18.9 lb of particulate/ton of refuse burned or 7.9 lb of particulate/ton of refuse charged. On a total basis, the incinerator emission factors were 32.9 lb of particulate/ton of refuse burned or 13.9 lb of particulate/ton of refuse charged. (Author abstract modified)

57942

APTIC NO. 73560

Schlein, Barry

MODELING OF GAS TURBINE ENGINES FOR NOX EMISSIONS: ALTITUDE PREDICTIONS. *Preprint, United Aircraft Corp., West Palm Beach, Fla., Pratt and Whitney Aircraft Div., 8p., 1974. 21 refs. (Presented at the Environmental Effects on Aircraft and Propulsion Systems, Proc., 11th National Conference, Trenton, N. J., 1974.)*

An analytical combustor model is used to predict the effect of altitude, combustor geometry, operating conditions, and fuel injector parameters on nitric oxide emissions from gas turbine powered aircraft. Emission levels predicted by the model exhibit good agreement with sea level data from a JT9D-7 engine, indicating that emissions at altitude correlate on the same curves used to present sea level data as a function of combustor inlet temperature. (Author abstract modified)

57943

APTIC NO. 75990

Spindt, R. S.

STUDY OF POLYNUCLEAR AROMATIC HYDROCARBON EMISSIONS FROM HEAVY DUTY DIESEL ENGINES (FINAL REPORT). *Gulf Research and Development Co., Pittsburgh, Pa., Office of Air and Waste Management and Coordinating Research Council, Inc., Contract 68-01-2116, Rept. EPA-460/3-74-022, 72p., July 1974. 8 refs.*

NTIS: PB 238688/AS

A collection system consisting of a precooler, a glass fiber particulate filter, and a Chromosorb-102 trap was developed to collect polynuclear aromatic compounds from the exhaust of a heavy duty diesel engine. Attempts to validate the sample collection system using carbon-14 tracers were not successful. The polynuclear aromatics injected into the exhaust apparently were largely destroyed by reactions with other exhaust components in contrast to engine-generated polynuclear aromatics on or within soot particles which survive these reactions. Fuel analyses showed that ASTM 1-D diesel fuels are nearly free of polynuclear aromatic compounds: the levels of these compounds in ASTM 2-D diesel fuels ranged from near zero to values that approach the average concentration in motor gasolines. (Author summary modified)

57944

APTIC NO. 84292

Stassen, J.

AIR POLLUTION. SCIENTIFIC AND TECHNICAL ASPECTS OF THE ANTI-POLLUTION LEGISLATION AND REGULATIONS. (*Pollution atmosphérique. Aspects scientifiques et techniques de la législation et de la réglementation antipollution*). Text in French. Ann. Mines Belg., no. 12:1165-1197, Dec. 1974.

Sulfur dioxide forms toxic sulfuric acid aerosols by oxidation in damp air; it is easily absorbed by vegetation, the soil, and surface waters, and accelerates the deterioration of materials. It increases severity of respiratory illnesses (1000 microgram/cu m for 1 hr), daily mortality rate (715 microgram/cu m and 750 microgram/cu m fumes), mortality (over 280 microgram/cu m for 24 hr). The tolerance limit for plants is 420 microgram/cu m; it reduces visibility at 8 km (285 microgram/cu m and 280 microgram/cu m of dust at 50% humidity), and increases by 50% the corrosion rate of steel materials (345 microgram/cu m). Sulfur dioxide is usually measured with volumetric, manual or continuous (conductimetric, potentiometric, coulometric, photometric) methods. Nitrogen oxides take part in photochemical reactions forming smog. They are usually measured as a whole by the Greiss-Saltzman procedure; colorimetry and chemiluminescence are used for differentiation. Carbon monoxide combines with hemoglobin to form carboxyhemoglobin; it should not exceed 50 ppm. It is measured by infrared absorption. Particulate matter comprises carbon, and numerous metallic elements, and may have extremely complex chemical composition. Reflectometry or sim-

ple filtering are used for suspended particles; heavy metals are analyzed by emission spectrometry, X-ray fluorescence, or atomic absorption activation and spectrometry. Industrial combustion installations produce major sulfur pollution. Coal installations are equipped with high yield dust removers. In unfavorable meteorological conditions, sulfur dioxide emissions should be reduced, at each chimney, to 2 g/cu nm or less, especially by utilizing liquid fuel containing about 1% sulfur. While waiting for gas purification processes to reach an industrial scale, the maximum threshold of sulfur dioxide in emissions should be 5 g/cu nm. By October 1976, sulfur dioxide emissions should not exceed 1.35 cu nm; 0.85 g/cu nm starting October 1980.

57945

APTIC NO. 76419

Steuer, W.

COMPLEX EFFECT OF AIR POLLUTION ON HUMANS FROM A BACTERIOLOGICAL VIEWPOINT.

(Gesamteinwirkung von Luftverschmutzung auf den Menschen aus der Sicht der Bakteriologie). Text in German. Praxis. Pneumol., vol. 28:772-775, 1974.

General problems of bacterial and viral air pollution in operating rooms, hospitals and other health care institutions are discussed. The varying high germ counts found in the air of operating rooms and in other rooms in which practically germ-free air is required is due to the use of central ventilation and air conditioning systems without adequate filters, and to the entrainment of germs from the water spray used in central humidifiers. Moreover, bacteria find a comfortable place for proliferation in vent ducts of central ventilation systems. Wall-to-wall carpets should not be used in hospitals and clinics since they release large quantities of dust and germs during cleaning.

57946

APTIC NO. 83775

Sullivan, K. M.

SULPHUR/DISTRIBUTION IN A FUEL FIRED POWER STATION BOILER.

Clean Air, 8(4):86-87, 1974.

The sulfur distribution of Great Northern seam coal when used in a pulverized coal fired boiler was determined. Approximately 98% of the total sulfur contained in the coal entering the boiler pulverizing mills leaves the boiler in the flue gas. Only a small portion of the total S is discharged as mill reject, while a similarly small amount is retained in the ash. (Author conclusions modified)

57947

APTIC NO. 83476

Thibodeaux, L. J. and N. J. Carter

COLIFORM EMISSIONS FROM AIR/WATER CONTACTORS: A PRELIMINARY ATTEMPT TO ESTABLISH MAXIMUM CONCENTRATIONS. AICHE Symp. Ser., 70(137):405-409, 1974. 15 refs.

The quantity and concentration of Escherichia coli bacteria (indicator microorganisms of pathogenic bacteria) in liquid aerosols generated during air/water contact operations involving wastewater were investigated. The average and maximum concentrations of Escherichia coli in cooling tower water simulated in a laboratory device were 6000 and 40,000 cells/cu m, respectively. Those measured in samples of aerosol taken at an activated sludge wastewater facility were 340 and 10,000 cells/cu m, respectively. Average and maximum coli concentrations estimated for a trickling filter were 340 and 1100 cells/cu m, respectively. The calculated respiration intake rates for a person breathing aerosols emitted by air/water contact operations were 100-1,000,000 times those allowed for drinking water intake.

57948

APTIC NO. 76313

Tommasi, Salvatore and Alessandro Giadrossi

CHARACTERIZATION OF THE POLLUTING GASEOUS EFFLUENTS DURING REFINING BY ELECTRICAL FURNACE. (Caratterizzazione degli effluenti gassosi

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inquinanti nell'affinazione al forno elettrico). Text in Italian. Tec. Ital., 39(7-12):77-85, June-Dec. 1974. 9 refs.

A mathematical method is presented for the quantitative assessment of gaseous effluents and determination of their composition. Results were experimentally verified by determining the dust content in the fumes prior to removal, the carbon dioxide and oxygen content of the fumes in the chimney, and the temperature of the fumes in various portions of the passageway. The dust sampling apparatus consisted of a filter-equipped fume probe, an auxiliary filter, a condenser to measure humidity, a regulation valve for the gas samples, and an aspiration pump. The sampling circuit for the gaseous effluents consisted of a collection probe, a filter, a system for the condensation and collection of the water vapor contained in the gas, a volume meter, a membrane pump, a distributor panel with three flowmeters, and analytical apparatus. The practical results conformed to the mathematical model.

57949

APTIC NO. 76458

Toscas, James

U. S. AIR POLLUTANT GENERATION IN 1967 (INTERIM REPORT). Illinois Univ., Urbana, Center for Advanced Computation, National Science Foundation Grant NSF GI-35179X, Rept. UIUC-CAC-DN-74-126, CAC 126, 41p., Jan. 1974. 10 refs.

NTIS: PB 239190

Data on air pollution generation during 1967 are assembled from existing data sources and are aggregated to correspond to a 97 sector input-output model. Industrial pollutants covered in the survey include: particulates, hydrocarbons, sulfur oxides, carbon monoxide, and nitrogen oxides. The possibility of establishing confidence limits for the results is precluded by the fact that the sources give little indication of the probable error in their results. Furthermore, the documentation of the methods employed to obtain the data is inadequate.

57950

APTIC NO. 80829

Turner, George S.

ELIMINATING ERRORS IN CHEMILUMINESCENCE NOX DETERMINATION IN AUTOMOBILE EXHAUST.

Preprint, Society of Automotive Engineers, Inc., Warrendale, Pa., 3p., 1974. 8 refs. (Presented at the Society of Automotive Engineers, International Automobile Tire Conference, Toronto, Ontario, Oct. 22-24, 1974, Paper 741032.)

Sources of possible error in the chemiluminescent determination of nitrogen oxides in automobile exhaust are discussed. Errors due to losses in the system leading to the analyzer can be minimized by performing a raw exhaust analysis which possesses the advantage of working with a relatively high concentration of NOx. Only nitric oxide is measured by the chemiluminescence procedure, and nitrogen dioxide must be determined by difference after conversion to NO. Conversion efficiency must be accurately known, and the molar response to NO and NO2 must be precisely equal to avoid error in determinations. Potential interferences include: reduction of NOx to nitrogen, quenching by carbon dioxide, ammonia interference, and water vapor condensation in the system.

57951

APTIC NO. 76011

Van Loan, M. and J. R. Sachschaile

A STUDY OF EMISSIONS FROM 1967-1974 LIGHT-DUTY VEHICLES IN LOS ANGELES AND ST. LOUIS. Automotive Environmental Systems, Inc., Westminster, Calif., Office of Air and Waste Management Contract 68-03-0390, Rept. EPA-460/3-74-016, 203p., Oct. 1974. 2 refs.

NTIS: PB 245842/AS

Exhaust and evaporative emissions from consumer-owned light-duty vehicles in the Los Angeles, California and the St. Louis, Missouri areas were measured to assess the contribution to atmospheric pollution made by emissions from 1967-

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1974 model-year vehicles. The vehicles were tested using the 1975 Federal Test Procedure. The mean levels of hydrocarbons, carbon monoxide, carbon dioxide, and nitrogen oxide exhaust emissions contributing to pollution in the Los Angeles area were: 4.75, 34.42, 557.1, and 3.32 g/mi, respectively. The corresponding figures for the St. Louis area were: 4.34, 37.52, 544.5, and 3.71 g/mi, respectively. These values were obtained from tests on 180 vehicles from each area. The evaporative hydrocarbon emissions from 20 1973 model year vehicles from the Los Angeles area averaged 0.45 g (Federal Test Procedure-Canister Method). (Author abstract modified)

57952

APTIC NO. 82279

Wellard, H. J.

WELDING FUME -- ITS CAUSE, EVALUATION AND CONTROL. *Welder*, 40(199):5-7, 1974. 4 refs.

The protection of workers from fumes likely to be injurious to health is required by law. Welding fumes can be caused by the heating of rods and fluxes or from the effect of the flame, arc, or radiation on the surrounding air or shielding gas or from coatings on the base metal. The present limit is 10 mg/cu m for iron oxide and for inert particles. It is possible from measurements of the rate of fume emission to estimate the volume of fresh air which must be introduced in order that the concentration of fume will not exceed 10 mg/cu m or any lower value required for a particular operation. Various types of welding can also produce ozone, nitric oxide, or nitrogen dioxide. Fume usually contains iron, manganese, oxides, and silicates, and may contain fluorides, chromium, and nickel. Particulate fume from welding of copper base alloys contains typically 40 to 60% copper. Welding accessories for the removal of fumes or protection against their effects are discussed.

57953

APTIC NO. 81818

Wood, C. M.

POLLUTION FROM ENERGY SUPPLY, CONVERSION AND USE. A REVIEW OF THE U.K. PROBLEM. *Int. J. Environ. Studies*, 6(4):253-266, 1974. 52 refs.

Trends in the consumption of coal, oil, natural gas, nuclear, and hydroelectric energy in the United Kingdom are reviewed, and forecasts of air pollutant emissions resulting from stationary and mobile emission sources are presented. Increases in hydrocarbon, nitrogen oxide, and aldehyde emissions are anticipated, with 1985 levels being 1.5-1.9, 2.4-2.8, and 0.055-0.065 metric tons, respectively, as compared with 1975 levels of 1.3-1.5, 2.0-2.2, and 0.40-0.50 metric tons, respectively. Smoke emissions are expected to decrease from 1975 levels of 0.35-0.45 metric tons to 0.06-0.12 metric tons by 1985. Sulfur dioxide emissions from coal, coke, and oil burning sources are generally expected to increase from 1975 levels of 6.00-7.10 metric tons to 5.70-8.90 metric tons in 1985. Sulfur dioxide emissions from coal burning sources are expected to significantly decrease over this period, however.

57954

APTIC NO. 76598

Yasuda, M., T. Ninomiya, S. Kawashima, and N. Mizoguchi
SURVEY ON THE TRAFFIC ENVIRONMENT IN OITA AND BEPPU REGION. (*Oita, Beppu chiku ni okeru kotsu kankyo chosa*). Text in Japanese. *Oita-ken Kogai Eisei Senta Nenpo* (Ann. Rept. Environ. Pollut. Public Health, Oita Prefect.), no. 1:91-96, Nov. 1974.

The results of a 4-year investigation of the air pollution associated with automobile traffic at 6 intersections in two cities of the Kyushu area are summarized for carbon monoxide level, airborne dust amount, and the dust lead content. The average lead level for the 4 years at 6 intersections ranged from 1.054 to 2.327 microgram/cu m. The average dust amount collected ranged from 0.064 to 2.627 mg/cu m. The correlation between the lead and CO levels, the lead level and the actual amount of traffic, and the CO level and the actual amount of traffic was not clearly observed at any of the intersections, although the lead and CO levels were higher during busy traf-

fic both in the morning (8 am to 12 pm) and the evening (4:30 pm to 9 pm).

57955

APTIC NO. 67095

Environmental Protection Agency, Needham Heights, Mass., Surveillance and Analysis Div.

VINYL CHLORIDE MONOMER SURVEY AT BORDEN CHEMICAL. *Preprint*, 38p., May 1974.

Vinyl chloride monomer was measured in 24-hour samplings on May 9, 10, and 13, 1974 at the Borden Chemical plant which manufactures industrial organic chemicals. Approximately 100,000 tons of polyvinyl chloride (PVC) are produced annually. Waste water sources and treatment facilities were studied. Vinyl chloride concentrations were detected in the water, sludge, and waste water samples. Meteorologic variables at the site were noted. Grab samples using glass gas syringes and Tedlar bags and 24-hour integrated samples using charcoal columns were used to monitor the air at stations in residential, industrial, residential-industrial, and rural areas around the plant. Spot samples were taken whenever odors from acetate and acrylate were noticed. Appendices are given which describe the PVC manufacturing process and which present the results of the water and air monitoring.

57956

APTIC NO. 67696

Environmental Protection Agency, Dallas, Tex.

MONITORING REPORTS ON VINYL CHLORIDE. VINYL CHLORIDE MONITORING AT THE GOODYEAR TIRE AND RUBBER CO. AND THE DOW CHEMICAL CO., PLAQUEMINE, LOUISIANA. *Preprint*, 16p., 1974.

Emissions of vinyl chloride were monitored at the Goodyear Tire and Rubber Co. and the Dow Chemical Co., Plaquemine, La. The Goodyear plant manufactures approximately 100 million tons/yr of polyvinyl chloride. The Dow Chemical Co. makes 9 million tons/day of chlorinated compounds including vinyl chloride monomer. Waste water and ambient air near the plant were measured, and results are given. Vinyl chloride concentrations, in the ambient air at the Goodyear plant were 0.003-7.81 ppm at the property lines, 0.000-0.34 ppm at 0.5 mi, 0.000-0.17 ppm at 0.75 mi, 0.002-0.181 ppm at 2 mi, and 0.000-0.001 ppm at 3 mi.

57957

APTIC NO. 67097

Environmental Protection Agency, San Francisco, Calif., Office of Enforcement

MONITORING REPORTS ON VINYL CHLORIDE. EVALUATION OF VINYL CHLORIDE EMISSIONS IN THE LONG BEACH AREA, CALIFORNIA. *Preprint*, 35p., May 1974.

Vinyl chloride monomer (VCM) was measured in the process wastes from the B. F. Goodrich and American Chemical Corp. plants in an industrialized area of Long Beach, Calif. The plant processes, the sampling methods, and results of the survey are described. Waste water and air were examined for the presence of VCM. Ambient air quality was evaluated by 10-minute grab sampling, 24-hour composite sampling, and 24-hour continuous sampling within the two plants and in the area of the plants. The effects of winds and other meteorological variables on the sampling were noted.

57958

APTIC NO. 67098

Environmental Protection Agency, Surveillance and Analysis Div.

VINYL CHLORIDE STUDY. *Preprint*, 12p., June 12, 1974.

A program to monitor vinyl chloride in the vicinity of polyvinyl chloride plants is described. Most of the air monitoring effort was centered around two plants, Diamond Shamrock and Stauffer Chemical, in Delaware City, Delaware. Water from the Union Carbide plant in South Charleston, W. Va. was also measured. Sampling and analytical methods, calibration

methods, and results are described. Vinyl chloride was found in the air and water near the sources. Monitoring should continue on a more systematic basis.

57959

APTIC NO. 67899

Environmental Protection Agency, New York, Office of Enforcement and General Counsel

VINYL CHLORIDE MONOMER INVESTIGATION. TENNECO CHEMICALS, INC. FLEMINGTON, NEW JERSEY. Preprint, 71p., June 1974.

Vinyl chloride monomer, a toxic chemical, was measured near a vinyl chloride plant located near Flemington, N. J. in the air and water. Polyvinyl chloride resin is manufactured at the plant by batch polymerization of vinyl chloride monomer. The vinyl chloride in the stack gas was 630 ppm. Vinyl chloride was also found in the waste water discharged, solid wastes, and polyvinyl chloride products. Within 2 mi of the plant, the vinyl chloride concentrations were in discrete samples 0.01 to 5.6 ppm. On the dryer building roof next to the vent was the highest concentration. At ground level, the concentrations ranged from 0.01 to 0.30 ppm. An air concentration of 0.07 ppm was found over the waste water inflow to the plant lagoon system. Integrated 24-hour samples had vinyl chloride monomer concentrations of 0.005-0.038 ppm on plant property and from less than detectable to 0.031 ppm outside the plant area. Integrated 1-hour air samples collected within 0.1 mi of the plant showed vinyl chloride present; samples easterly from the plant had 0.32 ppm; samples near the south side of the plant had 0.18 ppm. The sampling program, sampling methods, and results are described in detail.

57960

APTIC NO. 67100

Environmental Protection Agency, Surveillance and Analysis Div.

VINYL CHLORIDE SURVEY. UNIROYAL CHEMICAL. UNIROYAL PVC RESINS, INC. (ROBINTCH). PAINESVILLE, OHIO. Preprint, 57p., May 1974.

A survey to ascertain and quantify the presence of vinyl chloride in the ambient air, water, and solid waste discharges from the Uniroyal Chemical and Universal PVC, Inc. (Robintch) is described. The ambient air was surveyed by continuous 24-hour monitoring and grab-sampling techniques from May 9 to May 10 and May 13 to May 14, 1974. The impact of wind and other meteorological variables was noted. The analytical methods and results are described. The maximum vinyl monomer chloride (VCM) measured downwind of Uniroyal was 0.42 ppm, with upwind reading less than 0.03 ppm. On four occasions the upwind concentration was greater than the downwind concentration, possibly due to sampling error or gustiness of wind. Upwind concentrations were less than 0.03 ppm to 0.18 ppm VCM. The maximum reading downwind of Robintch was 2.26 ppm VCM; the corresponding upwind reading was 0.09 ppm. Carbon train sampling results ranged from 0.20 to 0.60 ppm VCM at Robintch.

57961

APTIC NO. 67101

Environmental Protection Agency, Atlanta, Ga., Surveillance and Analysis Div.

MONITORING REPORTS ON VINYL CHLORIDE. AMBIENT AIR SURVEILLANCE. B. F. GOODRICH CHEMICAL COMPANY. LOUISVILLE, KENTUCKY. Preprint, 56p., May 23, 1974.

Ambient air concentrations of vinyl chloride were measured in the vicinity of the B. F. Goodrich Chemical Company in Louisville, Kentucky from May 8 through May 16, 1974. The field investigation, laboratory analytical procedures, and analytical data are described. The chemical company manufactures synthetic resins and synthetic rubber including polyvinyl chloride resins, latexes and compounds; acrylonitrile rubber and latexes; styrene and butadiene resins and latexes; and acrylonitrile, butadiene, and styrene plastic resins and compounds. Integrated samples were taken to determine the 24-

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hour average exposure of local residents and employees of neighboring industries. Grab samples were taken to better identify the high concentrations and dispersion. The chemical processes at the plant, the air quality sampling methods, the meteorology in the area, and the sites are described. Results are presented.

57962

APTIC NO. 67117

Bureau of Mines, Washington, D. C., Div. of Fossil Fuels, Mineral Supply

ASSESSMENT OF THE IMPACT OF AIR QUALITY REQUIREMENTS ON COAL IN 1975, 1977, AND 1980 (FINAL REPORT). 237p., Jan. 1974. 7 refs.

Future supply/demand patterns for coal in relation to air quality standards in the electric utility, industrial, and residential/commercial markets of the United States are estimated for the years 1975, 1977, and 1980. Coal demand by electric utilities is forecast to increase from 1972 at average annual rates of 6.4% to 1975, 6.1% to 1977, and 6.5% to 1980, while requirements in the industrial and residential/commercial sectors are forecast to remain relatively stable. On the basis of estimated sulfur standards, it is estimated that for the consuming sectors covered in the study at least 243 million tons in 1975, 254 million tons in 1977, and 275 million tons in 1980 will not meet requirements unless utilities which report anticipated coal supplies for new plants at sulfur levels above the standards meet the regulations either through the use of pollution control processes or through the use of coals with permissible sulfur levels. Assuming either of the latter, estimated deficits in meeting the standards in the consuming sectors will approximate 199, 194, and 190 million tons, respectively, for 1975, 1977, and 1980.

57963

APTIC NO. 67130

Tokyo Metropolitan Government (Japan), Bureau of Environmental Protection

SURVEY ON AIR POLLUTION EMISSION FACTORS. Tokyo Metropolitan Research Institute for Environmental Protection 1-4-12, 91p., March 1974.

A survey of air pollution emission factors for both stationary and mobile emission sources throughout the 23 wards of the metropolitan area of Tokyo, Japan is presented. The survey includes the calculation of emission factors for air pollutants and the calculation of their intensity and contribution rates by different sources. The total annual sulfur oxide emissions in 1972 was 81,599 tons with stationary sources accounting for 95.6% and mobile sources the remaining 4.4%; total nitrogen oxide emissions amounted to 96,364 tons, 31% being from stationary sources and 69% from mobile sources. Mobile sources accounted for 94.6% of the 593,221 tons of carbon monoxide emitted during 1972, while stationary sources accounted for 5.4%. Hydrocarbon emissions were 219,474 tons in 1972, with 32.9% being from stationary sources and 67.1% from mobile sources; total particulate matter was 22,824 tons, with 95.5% being from stationary sources. Mobile sources accounted for 87% of the 1316 tons of aldehydes emitted in 1972, with the remaining 13% being from stationary sources. Emission factor measurements are also broken down by type of facility.

57964

APTIC NO. 72777

Federal Energy Administration, Washington, D. C., Interagency Task Force on Geothermal Energy

PROJECT INDEPENDENCE. GEOTHERMAL ENERGY (FINAL TASK FORCE REPORT). 123p., Nov. 1974.

A technical analysis of the potential production capabilities of the geothermal industry and problems involved in achieving such levels of production is presented. Topics considered include: the status of geothermal technology, constraints inhibiting rapid and widespread utilization, Federal actions to remove utilization barriers, and supply projections for business-as-usual and accelerated-demand conditions. The United States geothermal resource base compares favorably with present oil

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and gas reserves, with the most readily exploitable geothermal resources being located in the western third of the country. The cost of electricity produced from geothermal energy is estimated to be lower than that associated with fossil or nuclear fuel; geothermally produced electric power appears to be competitive with oil at \$4/barrel. Among the environmental problems associated with geothermal power production, commonly encountered air pollutants generated from the process include carbon dioxide, hydrogen sulfide, methane, and ammonia.

57965

APTIC NO. 73413

Kyoto City Inst. of Public Health (Japan)

SURVEY RESULTS ON PRESENCE OF NITROGEN OXIDES IN EXHAUST GASES FROM BOILERS AND INCINERATORS 1973. (*Boira oyobi shokyakuro haigas chu chisso sankabutsu chosa kekka, Showa 48-nendo*). Text in Japanese. 20p., July 1974. 3 refs.

Amounts of nitrogen oxides (NO_x) present in exhaust gases from boilers and incinerators were surveyed in Kyoto City, Japan, as a preliminary step toward controlling atmospheric pollution by nitrogen oxides. Using better quality heavy oil resulted in less nitrogen oxides emission. Use of city gas produced the least amount of nitrogen oxides. As installations became larger, more NO_x was emitted, and alkali wash was ineffective in purification. This survey was limited to finding relationships between fuel and NO_x emission.

57966

APTIC NO. 75191

PEDCo-Environmental Specialists, Inc., Cincinnati, Ohio

SOURCE INVENTORY AND EMISSION FACTOR ANALYSIS, VOLUME II (FINAL REPORT). *Environmental Protection Agency Contract 68-02-1350, Rept. EPA-450/3-75-082-b, 407p., Sept. 1974.*

NTIS: PB 248829/AS

Volume I describes a Source Inventory and Emission Factor Analysis (SIEFA), a program designed to determine the precision of emission inventories. Through application of the SIEFA program, users of the data generated in an emission inventory can have at hand not only the values derived from emission calculations but a definition of their quality; that is, a statement of the statistical precision of each value and the precision of the overall emission inventory. Volume II contains the Appendices to Volume I and include: precision of residential fuel use data; precision for determination of heating requirement factors for different fuels; precision for area source consumption of bituminous coal; calculation of precision of source test data; calculation of precision of light duty gasoline vehicle exhaust emission factors for carbon monoxide, hydrocarbons, and nitrogen oxides; emission factor precision tables; typical values for average SCC processes; and point source data used to develop precision of emission factors. (Author abstract)

57967

APTIC NO. 79833

California Air Resources Board, Sacramento, Evaluation and Planning

SUMMARY REPORT ON CURRENT METHODOLOGIES FOR DETERMINING THE SPATIAL DISTRIBUTION OF AIR POLLUTING EMISSIONS. *Dept. of Housing and Urban Development Grant CPA-CA-09-39-1032, CPA/1032.207, 37p., July 1974. 17 refs.*

NTIS: PB 237 864

Current methodologies for determining the spatial distributions for mobile and stationary source emissions are described. Coordinate systems for geocoding emissions are discussed and compared. Techniques for quantifying and disaggregating regional mobile source emissions to grid systems compatible with regional air quality models are discussed. (Author abstract)

57968

APTIC NO. 80240

Council on Environmental Quality

ENVIRONMENTAL IMPACTS OF ALTERNATIVES TO OUTER CONTINENTAL SHELF OIL AND GAS PRODUCTION. In: *OCS Oil and Gas -- An Environmental Assessment*, 33p., April 1974.

Six scenarios were utilized to examine the environmental impacts of alternatives to outer continental shelf oil and gas as energy resources for New England and two each for the Mid Atlantic and South Atlantic regions in 1985 and 2000. Major variables were the amounts of imported oil, OCS oil, OCS gas, coal, and nuclear energy. Coal was used to make up for reductions in other energy resources in all cases. Particulate emissions for New England vary with the amount of coal utilized and the coal supply end-use system. Nitrogen oxides emissions, primarily associated with coal and oil fired utility boiler operations, are similar in all New England scenarios for 1985 and decline by the year 2000 due to nuclear electric power generation. Sulfur dioxide emissions will be reduced by those scenarios in which coal is used mostly as synthetic fuels. The cases with the highest level of oil and gas production also have the highest emissions of hydrocarbons. Most of the environmental pollution trends in New England also apply to the Middle Atlantic and South Atlantic regions. Problems exist in meeting projected 1985 energy demands without significant quantities of OCS oil and gas. Many scenarios were forced to burn coal directly in 1985 because of predicted coal and gas shortfalls. This resulted in a sharp increase in air pollutants, particularly NO_x, sulfur oxides, and carbon monoxide. Advanced processes for converting coal into synthetic fuels should permit the use of coal resources in an environmentally acceptable fashion by 2000. (Author abstract modified)

57969

APTIC NO. 80241

Council on Environmental Quality

SOME ENVIRONMENTAL CONSIDERATIONS IN THE PETROLEUM REFINING INDUSTRY. In: *OCS Oil and Gas -- An Environmental Assessment*, 22p., April 1974.

A large new refinery is postulated, of a size and complexity consistent with current and anticipated near future design practices and product specifications. The typical new refinery is defined as a combination of standardized unit processes. The expected effluents are calculated for the unit processes, they are summed, and the distribution of the effluents is projected using accepted dispersion modeling practices. The estimated impact of the 200,000 bbl/day refinery upon ambient air quality indicates that the refinery alone will cause Federal ambient air quality standards for hydrocarbons to be exceeded. The modeling results indicate that the refinery alone will not cause Federal ambient air quality standards to be exceeded for sulfur dioxide, particulate matter, nitrogen dioxide, or carbon monoxide. The refinery will contribute quantities of the latter four pollutants to the ambient air, and could contribute to the violation of Federal ambient air quality standards even though the emissions from the refinery do not violate standards. Points within a radius of approximately 6 mi of the refinery are expected to exceed the 3 hr standard more than 1 day/mo on the average. Because of the size of the property needed, it would probably not be feasible to establish a greenbelt outside of which the ambient air standards would seldom be violated.

57970

APTIC NO. 80334

ECOLOGICAL DIAGNOSIS FOR THE PROVINCE OF EMIGLIA ROMAGNA. (*Diagnosi ecologica per l'Emilia Romagna*). Text in Italian. *Notizie*, no. 175:30-39, April 1974.

The main sources of pollution in Emilia Romagna were divided into 5 broad categories: population, animal rearing, agriculture, industry, and motor vehicles. The distribution of the pollutants particular to each group were analyzed for 341 municipalities. Organic pollution was principally a problem in

the area of rivers: the Po, the Po of Volano, and the Rhine. Control procedures for industrial and municipal water pollution are discussed. Sulfur dioxide was the most widespread air pollutant; 57% due to industrial emissions; 28% due to hydroelectric power plants; and 13.5% due to heating. Other emission sources are reviewed: industry is responsible for 81% of dust emissions and 100% of fluoride emissions; motor vehicles account for 92% of carbon monoxide, 80% of lead, and 60% of hydrocarbon emissions. Recovery of materials from solid wastes may be practical, because of the large volume of such wastes.

57971

APTIC NO. 81961

Council on Environmental Quality

AIR POLLUTION. In: *OCS Oil and Gas -- An Environmental Assessment*, p. 5A-30 - 5A-36, April 1974.

Air quality in the Charleston Air Quality Control Region is relatively poor for particulates and sulfur oxides, but relatively good for nitrogen oxides, hydrocarbons, and carbon monoxide. The ambient particulate loadings are due mainly to the industrial process loss of the mineral products industry in the Charleston locality. Electric utility fossil fuel combustion accounts for over 50% of the sulfur oxide loadings. Air quality is considerably better in the Eastern South Carolina/Eastern Georgia Region as a whole. As in the Charleston locality, the mineral products industry and electric utilities are responsible for most particulate air pollution. Even though the outer continental shelf impacts are significant for hydrocarbons and carbon monoxide, the total level of pollution loading will decrease from the 1972 levels due primarily to the emission controls required for mobile sources. The most significant loading impacts in the Charleston locality are particulates and sulfur oxides. The loading levels are predicted to increase almost three times under high OCS conditions for sulfur oxides by the year 2000. The primary sources of projected impact pollution loadings are induced fuel combustion and industrial process losses, as well as direct refinery and petrochemical process losses. The increases in ambient air concentration of particulates in the rural areas should be less evident than in the more populated centers such as Charleston.

57972

APTIC NO. 81962

Council on Environmental Quality

AIR POLLUTION. In: *OCS Oil and Gas -- An Environmental Assessment*, p. 4-30 - 4-36, April 1974.

The particulate level in Cumberland and Cape May Counties, New Jersey (30 microgram/cu m), is less than half the federal primary standard of 75 microgram/cu m. Since most of the hydrocarbon loadings for Base Case 2 and outer continental shelf impacts are from new refineries and petrochemical plants, the effects of these emissions on ambient concentrations should be relatively localized to the immediate vicinity of the new facilities. Even though percentage increases of particulates and nitrogen oxide emissions are large, the absolute magnitudes are small and should not present significant concentration problems. Sulfur oxides and carbon monoxide emissions may cause localized concentration problems, and specific site locations would have to be examined in depth. Air pollution in the Delaware River region is somewhat worse than in the two county local area. The majority of particulate and sulfur oxide emissions in the region are from fossil fuel combustion while nitrogen oxides are attributed mainly to mobile sources and electric utility fuel combustion. Mobile sources account for over 35% of hydrocarbon emissions in the region and 70% of carbon monoxide loadings. Future air pollution loadings in both base cases and in the impact cases are level or show small increases in the Delaware River region, due chiefly to the large base of heavy industry and large population currently existing in the region. The only pollutant emissions which shows any significant change is carbon monoxide, which should decrease by as much as 80% due to the emission controls expected to be placed on mobile sources by 1985.

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APTIC NO. 82277

Kanagawa Prefectural Government, Pollution Countermeasure Bureau

PRESENT SITUATION AND COUNTERMEASURES OF PHOTOCHEMICAL SMOG POLLUTION. (Kokagaku kōgai no genjo to taisaku). Text in Japanese. 78p., 1974.

In 1973 there were 30 urgent photochemical smog alerts involving 2526 persons in Kawasaki City. For the first time in Japan, the presence of acrolein, which irritates eyes, and methyl nitrate, which affects respiratory organs, was established; the presence of aromatic compounds was also confirmed. The reduction of the aromatics in gasoline fuel for automobiles has been urged. With the use of smog chambers, and with new analytical methods, it was proved that aromatic compounds break down by photochemical reaction into aldehydes and ketone compounds. The presence of such aromatic hydrocarbons contributes to the generation of nitrogen dioxide and ozone. The activities in research and control of photochemical smog pollution conducted by the prefectural government in 1973 are described.

57974

APTIC NO. 82722

Research Corp. of New England, Wethersfield, Conn.

ASSESSMENT AND RESULTS OF PARTICULATE AND SULFUR DIOXIDE AREA SOURCE SPACE HEATING EMISSIONS FOR NEW HAVEN AND BRIDGEPORT, CONNECTICUT. Environmental Protection Agency Contract 68-02-0046, Task 7, Rept. TRC-ER-42240-SR, 95p., Aug. 1974. 10 refs.

An inventory of area source space heating emissions of sulfur dioxide and particulates is presented for the cities of New Haven and Bridgeport, Connecticut. The total estimated particulate and SO₂ emissions in New Haven resulting from the heating of 77,925,330 sq ft are 1.1527 tons/day and 5.3262 tons/day, respectively. The total estimated particulate and SO₂ emissions for Bridgeport resulting from the heating of 67,119,353 sq ft are 0.993 tons/day and 1.592 tons/day, respectively. Bridgeport space heating area source emissions appear to be consistent with 1969 Air Quality Display Model results, whereas New Haven space heating emissions appear to have been underestimated by the 1969 modeling results.

57975

APTIC NO. 83872

Nagasaki Prefectural Government (Japan)

OFFENSIVE ODOR. (Akushu). Text in Japanese. In: *Nagasaki Prefectural Environmental White Paper for 1973*, p. 126-134, 1974.

The Nagasaki Prefectural Government has issued reports of the present state and policy for offensive odors in an Environmental White Paper for fiscal year 1973. In 1972, malodor related complaints were 30% of all the environmental complaints (812 cases) officially registered. The main sources of malodors in Nagasaki Prefecture were dead animal processing plants, absorption feed manufacturing plants, aquatic products processing plants, sewage treatment plants, human waste treatment plants, and pig farms and chicken farms, among which the methyl mercaptan from the absorption feed manufacturing plants affects the largest area due to the high chimneys employed in these plants. The malodorous substance regulation standards for ammonia, methyl mercaptan, hydrogen sulfide, methyl sulfide and trimethylamine in industrial areas are 2-6, 0.004-0.01, 0.06-0.2, 0.05-0.02 ppm and 0.02-0.07 ppm respectively, and in other areas 1-2, 0.002-0.004, 0.02-0.06, 0.01-0.02 and, 0.005-0.02 ppm, respectively. At present, the fundamental methods employed for the prevention of malodor are either one or a combination of the following listed processes: a gas washing method, an ozone oxidation method, a direct combustion method, a catalytic oxidation method, an absorption method, a chlorine treatment method, an air oxidation method, a masking method, a soil oxidation method, and an ion exchange resin method.

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57982

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APTIC NO. 79834

Aranovich, Y. V.

GENESIS OF NITRIC OXIDE IN SHALE PYROLYSIS GASES. (*K voprosu o proiskhojdenii okisi azota v slantcevikh pirogasakh*). Text in Russian. Tr. Nauchn. Issled. Inst. Slantsev, no. 19:56-60, 1973. 3 refs.

An experiment was carried out to prove that nitric oxide is an imminent component of a shale pyrolysis gas. The entire mass of the nitric oxide was found to be released at a temperature between 100 and 400 C. The release of the shale pyrolysis gas in general was at a temperature between 300 and 500 C. The decrease of nitric oxide content in shale pyrolysis gases cannot be reached by reducing the input of combustion product in the zone of the reactor.

57977

APTIC NO. 81831

Avenhaus, Rudolf and Wolf Haeefe

SYSTEMS ASPECTS OF ENVIRONMENTAL ACCOUNTABILITY. International Inst. for Applied Systems Analysis, Laxenburg (Austria). Rept. RR-73-6, 44p., Sept. 1973. 24 refs. (Presented at the Workshop on Systems Analysis and Modelling Approaches in Environment Systems, Zakopane, Poland, Sept. 17-22, 1973.)

A systems approach to analyzing the effect of anthropogenic activities resulting in air pollution on natural material balances is presented. Topics covered include: material balance models, verification of models by measurements at strategic points, and input-output analyses for economic accountability. The systems approach is applied to a fossil fuel power plant where sulfur enters with oil used for firing and leaves the plant in the form of sulfur dioxide.

57978

APTIC NO. 72796

Beecher, D. T., A. O. Isenberg, E. F. Sverdrup, and D. L. Keairns

CLEAN POWER GENERATION FROM COAL. Westinghouse Research and Development Center, Pittsburgh, Pa., Office of Coal Research Contract 14-32-0001-1223, Rept. 84, 339p., Jan. 23, 1973. 80 refs.

A systems study of various power generation concepts is presented. Topics covered include: alternative power plant configurations using coal; fuel cell battery development; turbine development; particulate removal (via cyclones or electrostatic precipitators) from high temperature, high pressure gases, with particular emphasis on fluidized bed combustion processes; and the development of a low cost solid electrolyte hydrogen production process. Each particular concept is analyzed in terms of its technical and economic feasibility. The information provided in connection with each task is incomplete due to premature termination of the study.

57979

APTIC NO. 83623

Bougie, Gus

NORTH DAKOTA LIGNITE BURNS CLEANLY IN CYCLONE FURNACE. Power Eng., 77(11):62-65, Nov. 1973.

The burning characteristics of high moisture North Dakota lignite were studied. Minor ash accumulations occurred on the leading tubes in the first and second bank of the secondary superheater, but they never approached bridging across the lanes. Nothing but a light dust and minor amounts of caked ash were found in the reheater and primary superheater. Ash in the economizer was cleaned off easily, but accumulation could be heavy if not blown frequently. Practically no ash accumulated in the cold end of the air heater. Numerous tests of the flue gas showed less than 1 ppm of sulfur trioxide. Stoichiometric amounts of sulfur dioxide in the range of 700 to 800 ppm were found downstream of the air heater. The correlation was good between expected and actual performance

data. In the case of dust the expected dust loading to stack was 0.85 lb/1000 lb flue gas, while actual dust loading was 0.765 lb/1000 lb flue gas.

57980

APTIC NO. 80256

Carroll, John J.

DETERMINATION OF TEMPERATURE, WINDS AND PARTICULATE CONCENTRATIONS IN CONNECTION WITH OPEN FIELD BURNING (FINAL REPORT). California Univ., Davis, Dept. of Agricultural Engineering, California Air Resources Board Contract ARB-2114, 160p., Nov. 1973.

An investigation of plume rise and smoke characteristics from open field burning of agricultural residues is reported. The design and execution of a program for measurement of smoke from such fires using a light aircraft is described as well as the data analysis techniques and procedures. Plume behavior was studied photographically and visually as a function of local wind and temperature structure and fire type. Plume rise from an open field burn is very sensitive to both wind speed and to fire type. The choice of an optimal fire strategy depends on whether total emissions are to be minimized or if ground level concentrations downwind of the source are to be minimized. The size distributions of the particulates as a function of local wind and temperature structure and fire type were also studied. (Author abstract modified)

57981

APTIC NO. 84451

Chambon, R. and P. Chambon

INDUSTRIAL MICROPOLLUTANTS. II. ASBESTOS. (*Etude de micropolluants d'origine industrielle: II. L. amiante*). Text in French. Lyon Pharm., 24(5):627-638, 1973. 66 refs.

Despite elaborate techniques, the determination of asbestos in the atmosphere remains difficult because of the minimal quantities and very small size of the fibers, which makes them invisible under the optical microscope, especially in the presence of other pollutants. Urban atmospheres contain about 100 microgram/cu m of asbestos particles. The British Occupational Health Society has proposed 2 fibers/cu cm as the acceptable limit. It is thought that asbestos concentrations insufficient to induce signs of asbestosis could trigger neoplastic processes. The pathogenic effects of asbestos mainly strike the lungs, the pleura, and the peritoneum, usually leading to asbestosis. After a latency period of about 20 years, there is fibrous thickening of the pleura. Carcinogenic action is dependent on the type of fiber. Mesothelial tumors (probably induced by crocidolite) can appear after 15-25 years of latency and are usually localized in the pleura and rapidly fatal despite various treatments. Commercial types of asbestos increase the incidence of lung cancers which appear 10-40 years after first exposure. Epidemiological, pathological, and physico-chemical research is being emphasized and legislation is trying to reduce risks of exposure not only for asbestos workers and the surrounding population, but also for city dwellers whose lungs have been found to contain crysotile fibrils.

57982

APTIC NO. 79822

Crecelius, E. A. and R. Carpenter

ARSENIC DISTRIBUTION IN WATERS AND SEDIMENTS OF THE PUGET SOUND REGION. National Science Foundation RANN Environmental Aspects of Trace Contaminants Program, Oak Ridge, Tenn., NSF Trace Contam. Conf. Proc., Annu., 1st, Oak Ridge, Tenn., 1973, p. 615-625. 3 refs. (Aug. 8-10.)

NTIS: Conf. 730802

The sediments, waters, suspended matter, and organisms of Puget Sound and nearby lakes and rivers were analyzed for arsenic. A large copper smelter releases approximately 300 tons/yr of arsenic in stack dust to the atmosphere, and roughly an equal amount in liquid effluent into Puget Sound. The smelter also dumps solid slag containing 1% As into Puget

Sound. Arsenic concentrations in sediments 5 to 10 mile from the smelter are 2 to 3 times background values. Dissolved arsenic concentrations in surface waters near the smelter are 1000 times background levels. There was no obvious relationship between the proximity to the smelter and the arsenic concentrations in organisms except for small crabs and shrimp caught on the slag pile. The smelter dust which is released to the atmosphere is wind transported over 30 mile and contributes arsenic to lakes and soils over this area. The arsenic levels in the sediments of lakes downwind of the smelter have increased several fold since the smelter began operating around 1900. (Author abstract modified)

57983

APTIC NO. 83622

Davey, T. R. A.

THE SULPHUR PROBLEM AND THE NON-FERROUS METAL INDUSTRIES IN AUSTRALIA. PART I. CONTRIBUTORY FACTORS. *Pace*, 26(8):20-23, 26-27, Aug. 1973.

The sources of sulfur air pollution in Australia are discussed. The primary sources of sulfur dioxide emissions in 1971 is the non-ferrous metals industry. It is estimated that 539,000 ton/yr of SO₂ were released. Other important sources include coal combustion and coke (467,000 tons/yr) and fuel oil combustion (241,000 ton/yr). If 90% of the SO₂ emitted from combustion of fossil fuels were recovered and converted to sulfuric acid, there would be a production of over 1.2 million ton H₂SO₄/yr.

57984

APTIC NO. 79897

Dziulak, Tadeusz

EVALUATION OF PERFORMANCE INDEXES AND PROSPECTS FOR THE DEVELOPMENT OF TWO-STROKE-HIGH SPEED INTERNAL COMBUSTION ENGINES WITH SPARK IGNITION. (*Kryteria oceny wskaźników pracy i perspektywy rozwoju dwusuwowych szybkoobrotowych silników spalinych z zapłonem iskrowym*). Text in Polish. *Zesz. Nauk. Politech. Śląski, Ser. Energ.*, vol. 46:33-49, 1973. 11 refs.

The characteristics and further development prospects of two-stroke high speed internal combustion engines with spark ignition is discussed from the point of view of toxicity of its combustion products. The effect of reduced compression ratio on comparative indexes of four-stroke and two-stroke engines and on their structural characteristics is analyzed. The average total amount of carbon monoxide and nitrogen oxides in the exhaust of a four-stroke engine is almost twice as large as in a two-stroke engine. Only under conditions of full load does the CO level of a two-stroke engine reach the level of a four-stroke engine. Furthermore, a two-stroke engine can easily meet the specifications imposed on the content of CO in its exhaust (4.5% of volume for East Germany). The concept of fuel injection supply is outlined and a modified electronic regulator is presented.

57985

APTIC NO. 76244

Eccleston, B. H. and R. W. Hurn

EXHAUST EMISSIONS FROM SMALL, UTILITY, INTERNAL COMBUSTION ENGINES. *SAE (Soc. Automotive Engrs.) Trans.*, vol. 81:741-749, 1973. 3 refs.

Exhaust emission measurements were performed on small (less than 25 horsepower), utility internal combustion engines typically used to power lawnmowers, garden tractors, portable power generators, snowmobiles, compressors, and the like. A total of 29 four-cycle and seven two-cycle spark ignition engines was used to obtain emissions data over full, partial, and no load conditions. The operation of four-cycle engines at full load and optimum air-fuel conditions resulted in average hydrocarbon, carbon monoxide, and nitrogen dioxide levels of 8, 180, and 5 g/horsepower-hour, respectively. The operation of two-cycle engines under comparable conditions resulted in average hydrocarbon, CO, and NO₂ levels of 140, 240, and 2 g/horsepower-hour, respectively.

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AIR POLLUTION ABSTRACTS, JUNE 1976

57986

APTIC NO. 67102

Fitchen, William

PROFILE OF AIR POLLUTION CONTROL - 1972. *Orange County Air Pollution Control District, Anaheim, Calif.*, 14p., May 1973.

The 1972 emission inventory for Orange County, California, is presented. An average of 4731 tons/day of all pollutants was determined. Motor vehicle pollution comprised 98% of the uncontrolled emissions in the county. The greatest part of this was carbon monoxide, which does not significantly contribute to photochemical smog. The primary contaminants responsible for the formation of photochemical smog are organic compounds and oxides of nitrogen. The large increase shown for vehicle emissions was due to a change in the measurement method required by the Environmental Protection Agency. A conversion was made from the seven-mode cycle to the constant volume system. For purposes of comparison with previous years, emissions measured by the seven-mode cycle are shown in parenthesis for motor vehicles. The inventory lists hydrocarbons, particulates, NO_x, CO, and sulfur oxides produced by various sources in Orange County. Stationary sources include: petroleum production, refining, and marketing; organic solvent users such as surface coating, dry cleaning, and degreasing; chemical plants such as petrochemical, sulfur, sulfuric acid, and pulp and paper plants; metallurgical plants; mineral processing plants including glass, asphalt, cement, and concrete plants; open burning and incineration; combustion of fuels in power plants, industry, and domestic and commercial locations; and agricultural sources such as debris burning, orchard heaters, and agricultural processing plants. Mobile sources include: gasoline exhaust, gasoline blowby, gasoline evaporation, diesel-powered motor vehicles, jet and piston aircraft, ships, and railroads. Air quality standards are compared with actual air quality in various areas of the county, and historical comparisons are presented.

57987

APTIC NO. 76251

Freiberg, K. J. and C. G. Haynes

EMISSION MONITORING SYSTEMS FOR PLUTONIUM FACILITIES. *Preprint, Atomic Energy Commission, Washington, D. C.*, 10p., 1973 (?). (Presented at the Atomic Energy Commission Air Cleaning Conference, 13th, 1973 (?).)

A system for the continuous monitoring of radioactive and chemical pollutants emitted from a plutonium facility is described. The chemical pollution monitoring system includes a sampling system conditioner, a data acquisition system, and analyzers for the detection of total hydrocarbons by flame ionization, sulfur dioxide and nitrogen oxides by electrochemical means, and carbon monoxide by nondispersive infrared analysis. The data acquisition system takes analog readings from all the analyzers of this system and logs them on standard tape cassettes. Radioactive pollutants are detected by single channel pulse height analyzer continuous air monitors that are capable of a digital output to a data acquisition unit. A multiplexing scanner and data logger are utilized to present a central readout of the various air monitors.

57988

APTIC NO. 76229

Garibay, M., Luis O.

AIR POLLUTION IN MEXICAN BORDER TOWNS.

(*Contaminación del aire en las ciudades fronterizas Mexicanas*). Text in Spanish. *Servicios Coordinados de Salud Publica, Hermosillo (Mexico)*, *Binat. Symp. Air Pollut.*, 1st, El Paso, Tex., 1973. p. 7-14. (Sept. 27-28.)

Sources of air pollution in Mexican border towns are reviewed and classified into three main categories: industry, trash burning, and motor vehicles. Motor vehicles appear to be responsible for serious air pollution problems, particularly in central urban areas. Trash burning causes pollution in small sections of some cities; significant reductions in pollution appear possible if this trash is recycled rather than burned. Industrial

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processes are underdeveloped and do not constitute a large-scale pollution risk.

57989

APTIC NO. 50019

Geffarth, Ulrich and Willi Stotzka

EMISSIONS FROM PIPE FLANGES. (Leckraten von Flanschdichtungen). Text in German. Wasser Luft betrieb, 17(3):92-93, 1973. 13 refs.

In five petrochemical plants, measurements of emissions by pipe flanges were taken in the period from June 1971 to Aug. 1972. For this purpose the flanges were encapsulated and flushed with nitrogen. About 20 l/hr of nitrogen passed through the encapsulation. The measurements were not intended to determine the influence of all parameters on the emission of pipe flanges. Despite this, the emissions reported in the literature were too high by factors 1000 to 1,000,000. The various substances lead to different emissions so that it is not enough to consider the physical condition only. Gaseous chlorine at a temperature of 25 C and a pressure of 4 atm was emitted at a rate of 0.0005 to 0.0001 micrograms/m/sec, toluene at 3 atm at a rate of 1.8 to 0.06 micrograms/cu/sec, and methane at 20 C and 45 atm at a rate of 0.4 to 0.01 micrograms/m/sec.

57990

APTIC NO. 80238

Gnyp, A. W., S. J. W. Price, C. C. St. Pierre, and B. Chongpison

AN INFORMATION SEARCH AND EVALUATION OF PROPERTIES, POTENTIAL SOURCES, LEVELS OF ATMOSPHERIC EMISSIONS AND ENVIRONMENTAL EFFECTS OF EXOTIC AIR POLLUTANTS. Preprint, Windsor Univ., Windsor (Canada), Industrial Research Inst., 383p., 1973. 26 refs.

The properties, potential sources, levels of atmospheric emissions, and environmental effects of major exotic air pollutants are summarized. Environmental air standards, detection and measurement, and abatement methods are also discussed. Data are provided on ammonia, arsenic, asbestos, barium, beryllium, boron, cadmium, chlorine, chromium, copper, fluorine, hydrocarbons, hydrochloric acid, hydrogen sulfide, iron, lead, manganese, mercury, nickel, phosphorus, selenium, vanadium, and zinc. (Author abstract modified)

57991

APTIC NO. 80257

Gouldin, F. C. and C. Cole

THE IMPACT OF FEDERAL AMBIENT AIR QUALITY STANDARDS ON COAL-FIRED POWER PLANTS. Cornell Univ., Ithaca, N. Y., Cornell Energy Project, National Science Foundation Grant, Paper 73-12, 30p., Dec. 1973. 30 refs.

The impact of the National Primary and Secondary Ambient Air Quality Standards on coal fired power plants is compared and contrasted with the Standards of Performance for New Stationary Sources. A mathematical diffusion model relating emissions to ground level ambient pollutant concentrations for a large, hypothetical power plant was analyzed. The model includes diffusion equations and considers plume rise, looping, coning, trapping by stationary and moving inversions, and inversion breakup. Extending the equations to the sampling time scale of the ambient standards is discussed. Large coal fired power plants that meet the particulate performance standards will have no difficulty complying with the secondary ambient air standards for particulates. Coal power stations that meet the performance standards for nitrogen dioxide must not exceed approximately 4500 MWe if they are to meet NO₂ ambient air standards. The requirement to meet secondary sulfur dioxide ambient air standards may limit the size of coal fired power plants. Plants that just meet the performance standards can be no larger than approximately 3000 MWe if ambient air SO₂ standards are to be met. (Author abstract modified)

57992

APTIC NO. 67104

Gronhovd, G. H., P. H. Tufte, and S. J. Selle

SOME STUDIES ON STACK EMISSIONS FROM LIGNITE-FIRED POWER PLANTS. Preprint, 28p., 1973. 6 refs. (Presented at the Lignite Symposium, Grand Forks, N. Dak., May 9-10, 1973.)

Tests were conducted at three pulverized coal-fired power plants, one cyclone-fired plant, and one spreader-stoker-fired plant, each burning lignite from a different mine to study the quantity and quality of stack emissions from boilers burning North Dakota lignite. The 1.2 lb/MM Btu sulfur dioxide emission limit was exceeded on 33 of the 46 test days, although a 40% reduction would have resulted in emissions under the limit. Significant amounts of sulfur were retained by the ash in most of the tests, with most of the results being between 10 and 40%. There were some indications that the retention was less with cyclone firing than with pulverized coal firing. The SO₂ emission was strongly influenced by the sodium content of the coal: increasing the Na from 0.9 to 6.1% in the ash reduced the SO₂ from 800 to 590 ppm. Boiler load did not greatly influence SO₂ emissions. Nitrogen oxide emissions were greater for cyclone-fired than for pulverized coal-fired units, and the fly ash particle size at the boiler outlet when burning low-Na lignite was also considerably greater for cyclone-firing units. Correlations developed in laboratory tests predicted that increasing the Na content of the ash from 0.9-6.1% would reduce resistivity by a factor of 100 in field tests.

57993

APTIC NO. 76225

Hanselka, C. Wayne

AIR POLLUTION POTENTIAL FROM AGRICULTURE ALONG THE TEXAS-MEXICO BORDER. Sul Ross Univ., Alpine, Tex., Dept. of Range Science, Binat. Symp. Air Pollut., 1st, El Paso, Tex., 1973, p. 15-21. (Sept. 27-28.)

A survey of agriculture land use and the potential for air pollution resulting from agricultural activities in Texas along the Rio Grande are reviewed. Potential sources of air pollution in the area include the use of insecticides and herbicides and the practice of open burning. Data concerning the kinds of chemicals used, rates of application, and number of applications per hectare per season are not available. Data are tabulated for agriculture land use and conservation needs in border counties of Texas.

57994

APTIC NO. 79203

Hardwick, G. C. and C. R. Hudson

FARM AND INDUSTRIAL TRACTORS EMISSION TRENDS AND THEIR IMPACT. Preprint, Society of Automotive Engineers, Inc., New York, 19p., 1973. 16 refs. (Presented at the Society of Automotive Engineers, National Combined Farm, Construction and Industrial Machinery and Fuels and Lubricants Meetings, Milwaukee, Wis., Sept. 10-13, 1973, Paper 730829.)

Estimates of the amount of air pollution released by wheeled farm and industrial tractors during 1972 based on population estimates and the 13-mode Federal heavy duty diesel engine emissions test cycle are presented. The impact on hydrocarbon and nitrogen dioxide emissions is shown to be less than 1.5% of the national total for 1972; diesel tractor emission contributions to carbon monoxide emissions amount to less than 3.2% of the national total. Estimates of the emissions contribution of wheeled tractors in concentrated urban areas in California and Illinois show an even lower effect, amounting to 0.6% or less of the total mobile source emissions. (Author abstract modified)

57995

APTIC NO. 80233

Hrufford, Bjorn F., Lennart N. Johanson, and Joseph L. McCarthy

STEAM STRIPPING ODOROUS SUBSTANCES FROM KRAFT EFFLUENT STREAMS (SEKOR). Washington

Univ., Seattle, Wash., Proj. 12040 EXQ, Rept. EPA-R2-73-196, 81p., April 1973. 40 refs.

Laboratory and design studies were performed relating to volatile constituents which appear in Kraft black liquor and condensate streams, and how these can best be removed and recovered. The volatile constituents, in order of decreasing concentration, are alcohols, terpenes, ketones, sulfur bearing compounds, and phenolic compounds. Methanol, the major alcohol contaminant, exists in from 280 to 8400 ppm in condensate streams, amounting to 11 to 16 lbs/ton of pulp produced. Terpenes range from a few ppm to about 4500 ppm in condensates, 4 to 9 lbs/ton of pulp. Acetone is present in concentrations of 2 to 200 ppm, corresponding to 0.07 to 0.4 lb/ton of pulp. Some 40 compounds were present in condensate streams. The feasibility of combining steam stripping of Kraft liquor with steam stripping of condensates was explored, and the conditions under which this may be warranted are reported. Steam stripping of black liquor and the last stages of evaporator condensates does not appear to be warranted except in unusual cases under most present mill situations. Exploratory type studies were made and are reported concerning improved methods of predicting vapor-liquid equilibria in such systems, and separation of the resulting volatile oils. (Author abstract)

57996

APTIC NO. 82736

Killin, A. M.

PROGRESS REPORT AIR POLLUTION CONTROL STUDY OF THE FERROALLOY INDUSTRY. *Metallurgical Society of the American Institute of Mechanical Engineers, Electr. Furn. Conf. Proc., Cincinnati, Ohio, 1973, p. 65-67. 7 refs. (Dec. 5-7.)*

Emission factors for the different ferroalloys were determined from information volunteered by the industry and from tests made by a contractor for the Environmental Protection Agency (EPA). The field test program used the full EPA sampling train in determining the emissions from nine furnaces. The conventional submerged arc furnace produces carbon monoxide and other gases from volatile matter and moisture in the charge materials. The gases rising through the furnace charge entrain fine particles of charge materials. Total particulate emissions to the atmosphere from electric furnaces in the ferroalloy industry during 1968 were estimated at 150,000 ton. This figure is based on an overall control efficiency of about 40%. Information submitted in response to questionnaires includes available test data and estimates for gaseous emissions from ferroalloy smelting and performance data for any emission control equipment. Total emissions for 1971 would have been 343,000 tons if all furnaces were uncontrolled. The facilities tested included every type of emission control system in service, furnaces producing different products, and a few furnaces with no emission control equipment. Four different control systems have been used by the ferroalloy industry: scrubbers serving open furnaces, cloth filters serving open furnaces, scrubbers serving covered furnaces, and electrostatic precipitators serving open furnaces. Considerations of raw material selection and pretreatment, operating flexibility, safety, and maximum utilization of existing facilities generally give an economic advantage to open furnaces. Existing controls result in the accumulation of substantial amounts of wastes in the form of either dusts or drained slurries.

57997

APTIC NO. 81809

LaBarre, N., J. B. Milne, and B. G. Oliver

LEAD CONTAMINATION OF SNOW. *Water Res., 7(8):1215-1218, Aug. 1973. 21 refs.*

The concentration of lead in snow samples collected from various urban areas was determined to assess the effects of snow disposal practices on the water quality of rivers and lakes used as dumping areas. The lead levels of snow collected along city roads were roughly proportional to the traffic volume. Lead concentrations of up to 4330 ppm were found in the particulate fraction of samples, while the highest concentration in the filtrate fraction of samples was 0.21 ppm (0.04

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ppm average). The dumping of snow away from water courses instead of directly into them is expected to significantly reduce lead contamination of water.

57998

APTIC NO. 80834

Maxim, L. D. and C. L. Brazie

A MULTISTAGE INPUT-OUTPUT MODEL FOR EVALUATION OF THE ENVIRONMENTAL IMPACT OF ENERGY SYSTEMS. *IEEE (Inst. Elec. Electron. Engrs.) Trans. Syst., Man. Cybern., 3(6):583-587, Nov. 1973. 6 refs.*

A multistage input-output model for the evaluation of environmental impacts associated with energy production systems is described. The model considers the efficiency and environmental impact of each stage in a given energy production process (extraction, storage, conversion, transmission) and can be used to assess the effect of alternative energy-producing chains (e.g., electric power from coal, oil, nuclear sources). The analytical form of the model is identical to an input-output scheme with technological coefficients that depend on the specific inputs and efficiencies of each stage. An example is provided, illustrating the model's ability to analyze the relationships between an energy system's efficiency and environmental impact. The generation of air pollutants such as sulfur oxides and nitrogen oxides is one of many types of environmental impacts that the model is capable of evaluating.

57999

APTIC NO. 76224

Mayaudon, Enrique Marquez

INDUSTRIAL AIR POLLUTION IN MEXICO AND ALONG THE MEXICAN-U. S. BORDER.

(Contaminacion del aire por industrias en Mexico a lo largo de la frontera norte). Text in Spanish. *Mejoramiento del Ambiente (Mexico), Binat. Symp. Air Pollut., 1st, El Paso, Tex., 1973, p. 34-41. 7 refs. (Sept. 27-28.)*

Census data from 1970 reveals that about 12,000 industrial firms are located in 13 Mexican border cities. Only 239 of the largest firms are identified as possible sources of air pollution. Baja, California North contains almost 50% of these 239 firms. A tabulation of these 239 firms by area and product manufactured is provided along with data on the industrial air pollution potential of each Mexican state along the Mexico-United States border.

58000

APTIC NO. 79804

Metsik, R. E. and K. I. Sillak

THERMAL STABILITY OF SULFUR COMPOUNDS IN SHALE PHENOLS. (*O termicheskoj stabilnosti sernistykh soedineniy v slantsevykh fenolakh*). Text in Russian. *Trudy Nauchno Issled. skogo Inst. Slantsev, no. 19:159-165, 1973. 8 refs.*

The thermal decomposition of sulfur compounds in water-soluble and resin phenols and their fractions obtained from shale during boiling for 16 hr was studied. Decomposition of the sulfur compounds, and liberation of hydrogen sulfide, mercaptans, thiophenes, and sulfides were observed. The quantity of these components increased with increasing temperature and increasing duration of the boiling. The decomposition was catalyzed by iron, corrosion products, and iron oxides. Carboxylic acids and chlorine salts acted as promoters of the decomposition. The H₂S formation was most intense in the case of resin phenols. The contents of organic sulfides, thiophenes, and mercaptans were highest during the decomposition of the sulfur compounds of water-soluble phenols. The H₂S and mercaptan sulfur released during boiling accounted for 1-10% of the total sulfur, or 0.001-0.01% of the phenol. The thiophene and sulfide sulfur released accounted for 20-30% in the case of water-soluble phenols, and for 6-7% in the case of resin phenols, which is 0.018-0.028% of the phenol.

EMISSION SOURCES

58006

58001

APTIC NO. 79983

Milkins, E. E. and H. C. Watson

THE AUTOMOBILE AND THE URBAN ENVIRONMENT. *Sci. Technol. (Surrey Hills, Aust.)*, 10(8):5-8, March/April 1973.

The automobile is examined as a source of urban air pollution. Urban air quality is defined as the result of the Air Quality Sum. Because of the 10-year lag between the introduction of control measures on new cars and the full effectiveness of such control, it is suggested that more stringent controls will be needed by 1976 if deterioration in air quality in the 1980s is to be avoided. The types of modifications necessary to the automobile to achieve the various proposed emissions reductions and the consequent vehicle cost increase are examined. When the vehicle emissions are reduced to less than 10% of their original value, the vehicle component in the Air Quality Sum becomes very small, and perhaps emissions reduction of other sources should be considered. Changes in traffic flow patterns are likely to affect total urban emissions, and design of traffic flow controls could be a factor in helping to control central urban district vehicle emissions. The use of alternative fuels as an emission control stratagem is possible, but problems exist in storage, distribution, and the assurance of adequate supplies. Propane, natural gas, and alcohol are discussed as fuels. Regular maintenance of engine systems and the use of lighter vehicles can reduce the emissions entering the urban atmosphere.

58002

APTIC NO. 83421

Mirchev, Vasil and Dimitu Minkov

EMISSION OF TOXIC SUBSTANCES IN THE AIR AROUND SOFIA. *Text in Russian. Tr. Nauchnoissled. Inst. Vodosnabdyavane Kanal. Sanit. Tekh.*, 8(3):125-138, 1973. 4 refs.

Toxic substances in the air around Sofia were studied. The industrial complex of the city was divided into six groups, according to the toxic substances the emit. Data for the concentrations of the basic toxic substances of representative industries from each group are given. A short analysis of these data is provided, and some recommendations for the protection and improvement of the air quality around Sofia are suggested. Ineffective pollution control installations are found to be the main culprit in undesirable levels of pollution.

58003

APTIC NO. 80264

Morris, D. N.

ENERGY DEMAND AND ITS EFFECT ON THE ENVIRONMENT. *Rand Corp., Santa Monica, Calif.*, 26p., July 1973.

NTIS, DDC: AD/A-002 123

The major sources of all air pollutants except particulates are automobiles and power plants. Although strict emission standards are being placed on autos, it may be necessary to consider additional measures to meet ambient air quality standards for urban areas. The only options available for stationary systems are substitution of cleaner fuels and installation of control equipment. Substitution of fuels is already in evidence. Techniques for capturing sulfur oxides and particulates are available. Nitrogen oxides, always formed when fossil fuels burn in air, can be reduced somewhat by control of combustion, two stage combustion, or flue gas recirculation. These methods alone are probably insufficient for future standards, but no commercial processes yet exist for active removal of nitrogen oxides from stack gases. Electric utilities can also generate electricity by other means than burning fossil fuel under a boiler. Possibilities include hydropower, geothermal power, and nuclear reactors. Environmental difficulties associated with possible accidents and waste disposal from nuclear power plants are discussed.

58004

APTIC NO. 78768

Myers, James E. and Charles G. Immich

NATURAL RADIOACTIVITY IN APPALACHIAN FLY ASHES. *Trans. Kansas Acad. Sci.*, 75(2):174-181, April 17, 1973. 15 refs.

Neutron activation analysis of nine samples of fly ash from various regions in the United States was performed to study the production of isobars via beta-decay from isotopes of thorium and uranium. Identification of protactinium-233 and neptunium-239 during activation analysis suggested the prominence of natural fissiogenic materials in coal stack gas and particulate residues. Levels of thorium and uranium ranged from 20.0 and 9.9 ppm, respectively, for eastern fly ash to 2000 and 660 ppm, respectively, for western fly ash. Radioactive emission estimates of radium-226, radium-228, thorium-228, thorium-232, and uranium-238 ranged as high as 95.05% of the maximum allowable radioactive emission values (state of Kansas) for the western fly ash samples. Thus environmental hazards produced by western coal utilization may warrant more stringent regulation of radioactive emissions from coal-fired power plants. The presence of actinides in coal ignition residues may serve as an economical source for uranium and thorium.

58005

APTIC NO. 84482

Paluch, Jan

THE CLASSICAL INDUSTRY AND THE ENVIRONMENT. (*Przemysl Chemiczny A Srodowisko*) *Text in Polish. Przemysl Chem.*, 52(1):26-29, 1973.

An analysis of the adverse effect of the chemical industry on the environment and ecosphere was carried out with the objective of evaluating the extent of damage inflicted. The development of chemical and petrochemical and industrialization contributed greatly to excessive air and water pollution. Urbanization and its concomitant spread chemical plants with resulting producing growth added more problems, such as release of industrial wastes and ever rising pollution levels as well as that of newer types of pollutants. Although, on a global scale, dust emission was reduced considerably, gas emission, with its higher toxicity, was not reduced to the same degree. While world-wide dust emission dropped from 1967-1970 from 26.3% to 23.1% and gas emission from 44.7% to 39%, the emission increase for 1970, as compared to 1969, rose by 8.1% for industrial dusts and for industrial gases by 34% due to increased chemical production. Further, the proportion of dust and gas pollution between 1967-1970 rose in the nitrate-producing industry from 53.8% to 64.8% and 14.6% to 28%, respectively, in petrochemistry and refinery installations from 5.1% to 6.9% and fell from 37.3% to 26.6%, respectively. It was established that dust pollution could be more effectively controlled than that of gas for which in many fields no adequate scientific basis was available. As a result, no economically feasible solutions on an industrial scale for reduced gas emission and purification of waste gases were found.

58006

APTIC NO. 80211

Parker, John

THE ESTIMATION OF AIRPORT POLLUTION EMISSIONS. *Interavia*, 28(9):990-991, Sept. 1973. 4 refs.

Estimates of the contribution to air pollution resulting from operations at the London-Gatwick Airport are presented. Carbon monoxide, nitrogen oxide, hydrocarbon, and particulate levels generated by aircraft operations and road traffic at the airport are 4.49, 6.38, 1.46, and 0.08 tons/day, respectively. The London-Gatwick Airport appears to be on the whole a comparatively minor contributor to local metropolitan air pollution, accounting for about the same amount of smoke daily as a small town of some 2000 inhabitants.

58007

APTIC NO. 76226

Russel, Woody

VEHICULAR AIR POLLUTION IN THE UNITED STATES ALONG THE BORDER. Texas Air Control Board, El Paso, Binst. Symp. Air Pollut., 1st, El Paso, Tex., 1973. p. 42-49. (Sept. 27-28.)

The problem of motor vehicle emissions along the Mexican-American border is discussed. Although the population and number of resident vehicles are small along the border, stop-and-go traffic at ports of entry and the average age of Mexican motor vehicles, which generally lack air pollution controls, contribute to a significant air pollution problem. Possible solutions to the air pollution problem along the border include the provision for additional check points at ports of entry and the establishment of an Air Pollution Control Boundary Commission capable of enforcing stringent air pollution regulations in both the United States and Mexico. Hydrocarbon, nitrogen oxide, and carbon monoxide levels (tons/yr) are tabulated for urban and rural areas of six border counties.

58008

APTIC NO. 81854

Shefer, Daniel

FORECASTING INDUSTRIAL AIR POLLUTION IN THE HAIFA BAY AREA WITH AN INPUT-OUTPUT MODEL. Socio-Econ. Plan. Sci., vol. 7:397-406, 1973. 8 refs.

An input-output model for forecasting industrial air pollution in the Haifa Bay area is described. Input/output tables are used to describe the entire system of economic activity in the region, and the economic system of Haifa is divided into 18 major industrial branches. Quantities of hydrocarbons, sulfur oxides, nitrogen oxides, and particulates are computed as kg/day for each major industrial branch. The percentage contribution of each of the economic branches to the total pollution in the region is tabulated, and direct pollution coefficients for each type of pollutant in each industrial branch are computed. The model predicts that the level of pollution in 1975 is slightly less than twice that in 1970 and that for the period from 1970-1980 the pollution level increases by 230%.

58009

APTIC NO. 76227

Shoultz, J. M.

AIR POLLUTION FROM UNITED STATES INDUSTRIAL SOURCES ALONG THE UNITED STATES-MEXICO BORDER. El Paso City-County Health Unit, Tex., Binst. Symp. Air Pollut., 1st, El Paso, Tex., 1973. p. 28-33. (Sept. 27-28.)

Estimates of air pollution generated by American industries along the United States-Mexico border are presented. Point source emissions from the states of Texas, New Mexico, Arizona, and California total 170,731 metric tons/yr (1970) for particulates, 1,013,804 tons/yr for sulfur oxides, 68,010 tons/yr for nitrogen oxides, 32,459 tons/yr for hydrocarbons, and 123,216 tons/yr for carbon monoxide. Sulfur oxides, the largest emission along the border, accounts for 18.6% of the total amount emitted in the United States.

58010

APTIC NO. 81974

Smith, Glenn R., Glen A. Stone, Ronald L. Stanley, Leslie M. Carpenter, Krishna Seshan, and Peter K. Mueller

IDENTIFICATION OF AIRBORNE ASBESTOS BY SELECTED AREA ELECTRON DIFFRACTION. Preprint, Electron Microscope Society of America, 2p., 1973. 2 refs. (Presented at the Electron Microscope Society of America Annual Meeting, 31st, Aug. 1973.)

A method utilizing electron microscopy and selected area diffraction was developed to identify the asbestos fiber type for minute fibers. A computer program has been developed which compiles and stores physical parameters, d spacings and interplanar angles for 25 standard minerals associated with asbestos. The computer program utilizes data obtained from

the electron diffraction patterns to compute the interplanar spacings and angles. The program then compares the computed data with the stored data to unambiguously identify the unknown minerals. This technique can be expanded to identify most crystalline particles encountered in ambient air and in addition identifies the particles as compounds.

58011

APTIC NO. 81528

Tikhonova, V. S., Z. M. Shlaen, and E. G. Zakharenko

SULPHUR IN THE COAL OF THE LVOV-VOLINSK COAL BASIN. (Sirka u vugulli Ivivsko-volinskogo kamnyovugilnogo basynu). Geol. Geokhim. Goryuch. Iskop., vol. 35:99-102, 1973. 7 refs. Translated from Russian, 8p.

Data on the sulfur content of 56 coal samples and their ashes obtained from the Lvov-Volinsk coal basin are presented. The coal in the basin typically contains sulfur in amounts ranging from 2.5-4.5%. Upper coal beds contain the highest sulfur content (over 3%), while lower beds contain coal with a 2.5% sulfur content. The sulfur is predominantly connected with organic compounds in the coal (up to 90% organic sulfur), while in most coal samples non-organic sulfur does not exceed 1%.

58012

APTIC NO. 84354

Vesely, V.

PROSPECTS FOR MOTOR FUELS IN CZECHOSLOVAKIA FROM THE VIEWPOINT OF THE SUPPRESSION OF NOXIOUS EMISSIONS.

(Perspektivy motornych paliv v CSSR z hlediska potlacania skodlivin). Text in Slov. Ropa Uhlie, 15(3):131-147, March 1973. 92 refs.

Present-day internal combustion engines are responsible for the production of numerous noxious emissions: carbon monoxide, carbon dioxide, and hydrocarbons, including carcinogenic polynuclear aromatic hydrocarbons and aldehydes, nitrogen oxides, sulfur oxides, lead, phosphorus, cadmium, solid-state particles, soot, and other secondary noxious emissions. A review of studies conducted in various parts of the world (Europe, U. S., USSR, Japan) indicates the threat these emissions pose to the environment, and the difficulties involved in their control. These noxious emissions are a growing problem in Czechoslovakia as well as in other parts of the world, and the major task is how to remove them most economically. In the U. S., for example, the expenditure required for complete removal of lead from gasoline would be at least two billion dollars. The problem of noxious emissions produced by motor fuels is as yet unsolved in Czechoslovakia, and its solution may be found through the coordinated efforts of Czechoslovak specialists, aided by the experience of other countries.

58013

APTIC NO. 84424

Wasilewska, J. and U. Krouse

DUST EMISSION INDICES FROM BLAST FURNACE SLAG PROCESSING PLANTS. (Wskazniki emisji pyłu z zakładów przerobu żużla wielkopiecowego). Air Conserv. (English translation from Polish of: Ochrona Powietrza), 7(6):17-26, 1973. 10 refs.

NTIS: TT 73-54096/6

Dust emission indices from blast furnace slag processing plants in Poland were tabulated. Processing of wet slag resulted in minimal dust pollution (from 0.033 to 0.877 g/cu m, depending upon the place of measurement). The velocity of air flow ranged from 1.6 to 2.1 m/sec. Maximal emission of dust occurred during dry slag processing. Measurement for maximal dust emission was based on a 1/4 yearly period of work. The dust content in the stream of flowing air was very high, ranging from 2.83 to 3.98 g/cu m. The velocity of the air flow was from 2.7 to 3.3 m/sec.

EMISSION SOURCES

58018

58014

APLIC NO. 83423

Zlateva, P. and K. Ionkova

ATMOSPHERIC AIR POLLUTION OVER SOFIA WITH SULFUR OXIDES EMITTED IN THE FLUE GASES OF POWER PLANTS AND MUNICIPAL SOURCES.

Text in Russian. Nauchnoizsled. Inst. Vodosnabdyavane Kanal. Sanit. Tekh., 8(13):125-138, 1973. 4 refs.

This paper examines the type, amount and the extent of air pollution over Sofia. A two year study was undertaken at two heat and electric power plants (HEP): the steam power plant at the Bulgarian Academy of Sciences, and the sources of energy at several municipal buildings. The amount of sulfur dioxide emitted into the air is discussed. A total conversion from coal to oil would significantly decrease the amount of pollutants in the air. The study concludes that the maximum amount of SO₂ in the air is 0.3 mg/cu m for the Sofia HEP (which is 0.05 mg/cu m over the norm), and 0.04 mg/cu m for the Traicho Kostov HEP.

1972

58015

APLIC NO. 81001

Aubert, J.

EFFECT OF MARITIME AEROSOLS ON THE ENVIRONMENT. Rev. Intern. Oceanogr. Med., vol. 26:43-52, 1972. 4 refs.

One of the most important processes in the circulation of numerous substances over the continents is the formation of aerosols above the oceans. These result from the bursting of bubbles in the uppermost layer of the sea. The sodium to potassium ratio in the aerosol droplets is reversed compared to that in sea water. These fine droplets, which contain various types of suspended matter, are prone to engulf marine microorganisms as well as characteristic endogenous or exogenous chemical substances, which are sometimes carried several km inland. Thus, they may lead to contamination of the land environment. The diffusion of both marine and land microorganisms by aerosols from polluted marine areas was studied. Land bacteria were found in larger amounts than marine bacteria in a highly polluted area near a sewer outlet. Large amounts of marine bacteria and very small amounts of land bacteria were collected in a low pollution area. Another study in an unpolluted area revealed the presence of marine bacteria at all altitudes from 0 to 25 m. A tank of sea water was used for experimental studies. Depending on the distance, the transport of bacteria tended to decrease, while the duration of the aerosol increased.

58016

APLIC NO. 80093

Birne, E. A. B.

CONTROL OF INDUSTRIAL AIR POLLUTION IN SCOTLAND. Inst. for Industrial Research and Standards, Dublin (Ireland). Air Pollution Symp. Proc., Dublin, Ireland, 1972, p. 66-76. (March 22.)

Control of air pollution in Scotland does not differ much from England or Wales. Administrative procedures vary mainly with differences between the Scottish and English law. The greatest progress to date has been made in the control of industrial air pollution. All the present day legislation could be said to have originated with the first Alkali Act. Smoke, grit, and dust from the numerous small industrial uses of coal and oil are controlled by Scottish Local Authorities under the Clean Air Acts of 1956 and 1968. Only relatively harmless amounts of radioactivity have been discharged to the air from nuclear power stations in Scotland. A condition of the authorization to discharge waste gases is that the operators take the best practical means to prevent radioactive emissions. Although domestic smoke is now 80% of the total smoke at ground level in Scotland, it has been reduced in the past decade by the introduction of smoke controlled areas and to some extent by changing social habits toward central heating or unit heating by gas and electricity. Emission of fumes and dusts in Scotland is controlled by a

variety of methods: cyclones, electrostatic precipitators, bag filters, and venturi scrubbers. Most of the reduction of smoke under the Clean Air Acts and the Alkali Act may be discounted by the savings in fuel costs. The requirement to reduce grit and dust is mainly nonproductive expenditure.

58017

APLIC NO. 42891

Detrie, J. -P.

INDUSTRIAL POLLUTION, ITS PREVENTION AND COST. *La pollution industrielle, sa prevention, son coût.* Text in French. Pollut. Atmos. (Paris), 14(54):188-195, April-June 1972.

The state of the art of air pollution control in France is outlined with special regard to industrial pollution and future developments. The experience gained during the past 10 years encourages optimism, as technical means necessary to reduce the hazards of elevated pollution levels are available. The reduction of emissions in the cement industry has been particularly spectacular. Improved technologies in many cases help abate pollution, e.g., in sulfuric acid production. The problem of odorous emissions from petroleum refineries is nearly solved, and similar problems in pulp and paper industry have been attacked. Dust separators and other available control equipment satisfy all needs of the industry, but sampling and measuring techniques are far from adequate. The utilization in the future of both nuclear and solar energy will acquire increased importance. As nuisances generated by different sources are hard to compare, a global attack on emissions caused by industry, domestic heating, and traffic will be necessary. The costs of air pollution control for large industries will amount to 2 to 15% of the total investment, and the maintenance of equipment will account for 1-5% of the maintenance costs. The total sulfur dioxide emission in France is relatively low compared to other countries due to the extensive use of low-sulfur fuel. The pollution level in Paris shown a marked downward trend over many years. The carbon dioxide concentration in Paris increased from 315 ppm in 1900 to 360 ppm in 1970, corresponding to a yearly rate of increase of 0.6 ppm.

58018

APLIC NO. 40831

Filatova, A. S., V. B. Kapitskiy, and A. I. Kuzminykh

THE QUESTION OF STANDARDIZING CARCINOGENIC SUBSTANCES IN THE AIR OF INDUSTRIAL PREMISES. (K voprosu o normirovanii kancerogennykh veshchestv v vozdukh proizvodstvennykh pomeshcheniy). Text in Russian. Gigiena i Sanit., 37(2):91-93, 1972. 5 refs.

The problem of standardizing carcinogenic substances in the air of industrial plants is discussed with special regard to polycyclic aromatic hydrocarbons resulting from incomplete combustion particularly in cokeries and metallurgical plants. Tar and pitch, present in the air in the form of aerosols, causes occupational skin cancer. Analyses revealed that neutral aromatic polycyclic hydrocarbons, i.e., principal carcinogenic substances, represent a major proportion of the organic pollutants in cokerie and metallurgical plant air. Compounds such as 3,4-benzopyrene, 1,12-benzperylene, pyrene, phenanthrene, anthracene, and carbazole were determined quantitatively, and chrysene, 1,2-benzanthracene, carbonic acids, phenols, and bases were identified. Since the carcinogenic substances are present in complex mixtures, and since their synergism should be taken into account, the standard to be established should be based on the sum of all tarry products resulting from incomplete combustion, and data from occupational hygiene, epidemiology, and animal tests should be utilized. Animal experiments revealed the fact that 3,4-benzopyrene cannot be regarded as the principal carcinogenic substance in tarry products.

58019

APTIC NO. 84537

Fukuoka, Yoshitaka

AIR POLLUTION ALONG THE MOUNTAIN MOTOR ROAD FOR SIGHTSEEING. (Skyline endo no taikisen chosa). Text in Japanese. Taiki Osen Kenkyu (J. Japan. Soc. Air Pollution), 7(1):27-32, 1972. 6 refs.

Plant damage due to auto exhaust along mountain motor roads for sightseeing was studied. Measurements of exhaust were carried out 4 times from August 1971 along the Azuma skyline drive in Fukushima Prefecture. The road is 29 km in length, at an altitude of 1350 m. The plant damage included withering of trees on the valley side on the leeward of the road. The determination revealed unexpectedly high air pollution, such as a high of 20 ppm of carbon monoxide and 0.7 ppm of nitrogen dioxide. Sulfur dioxide could not be detected.

58020

APTIC NO. 43081

Hall, J. Alfred

FOREST FUELS, PRESCRIBED FIRE, AND AIR QUALITY. Forest Service, Portland, Ore., Pacific Northwest Forest and Range Experiment Station, 44p., 1972. 64 refs.

Combustion products or smoke from forest wildfires or prescribed burning are often considered on a par with any other emission that might affect air quality. The combustion of forest fuels is related to emissions of carbon monoxide, particulates, sulfur dioxide, hydrocarbons, nitric oxide, peroxyacyl nitrates, and photochemical smog. However, enough is known about smoke from woody fuels to indicate that its importance is limited almost entirely to visibility obstruction, an effect that can be minimized by proper timing and preparation for burning. Much of the organic matter in smoke from forest fuels is similar to material normally entering the atmosphere from vegetative life or from the decomposition of vegetative matter. Fire compresses these processes into a shorter time. Environmental effects of prescribed burning are far more than compensated for by great reduction in danger of disastrous forest conflagrations. Requirements for complete combustion are indicated, as well as the products of straight distillation, pyrolysis, and combustion.

58021

APTIC NO. 38396

Hall, Stephen K.

SULFUR COMPOUNDS IN THE ATMOSPHERE.

Chemistry, 45(3):16-18, March 1972. 3 refs.

Among the most common atmospheric pollutants in the United States are hydrogen sulfide, mercaptans, sulfur dioxide, sulfur trioxide, and sulfuric acid. The odor of hydrogen sulfide and mercaptans is a nuisance, but these substances are rarely present in concentrations high enough to damage vegetation or irritate the eyes and respiratory system. Sulfur dioxide can injure man and livestock, damage plants and materials, and interfere with visibility. Exposure to about 1 ppm for 10 min generally increases respiratory and pulse rates, and a slightly higher concentration noticeably affects most persons within a few minutes. An exposure at about 5 ppm causes bronchoconstriction in healthy individuals; higher concentrations produce eye, nose, and throat irritation, and severe distress. In the atmosphere, sulfur dioxide is slowly oxidized to sulfur trioxide, which reacts with fog droplets to form sulfuric acid mist. The toxic effects of sulfur dioxide are accentuated when sulfuric acid mist is present. Both sulfur dioxide and sulfuric acid mist accelerate corrosion of metals. Sulfuric acid mist attacks building materials, particularly limestone and marble. If atmospheric sulfur dioxide can be reduced to levels that cause no adverse health effects, the effects on vegetation will be eliminated, visibility will be improved, and material damage will be reduced.

58022

APTIC NO. 41328

Hess, W.

DEVELOPMENT OF CLEAN AIR CONTROL IN SWITZERLAND. Clean Air (J. Clean Air Soc. Australia New

Zealand), 6(2):8-11, Feb. 1972. (Presented at the Swiss Association for Water Protection and Air Hygiene, Chur, Switzerland, April 30, 1971.)

At present there is no air pollution problem in Switzerland, but in recent years air quality has lessened. The air pollution problems that occur come from industrial processes, gases and smoke from domestic furnaces, and automobile exhaust. The biggest gap is in technical expertise. At present there is no one in training in air hygiene, and there is no office for environmental protection. Investigation in Zurich show that 75% of the automobiles exceed the guidelines for 4.5% carbon monoxide emission while idling. Barely half of all solid waste is incinerated in units with waste gas cleaning equipment. Dust fall in Zurich has been measured as high as 64 t/sq mi/mo. Carbon monoxide increases with traffic surges and sulfur dioxide concentrations vary annually with the demand for domestic heating. Swiss regulations and their execution are mentioned.

58023

APTIC NO. 38589

Huenigen, Edmund

MEASURES FOR THE ABATEMENT OF AUTOMOTIVE EMISSIONS. (Massnahmen zur Verringerung der Immissionen, die durch Kraftfahrzeugabgase verursacht werden).

Text in German. In: Technik und Umweltschutz Luft-Wasser-Boden-Lärm. Kammer der Technik, Brennstoff-technische Gesellschaft in der Deutschen Demokratischen Republik (ed.), Leipzig, VEB Deutscher Verlag fuer Grundstoffindustrie, 1972, p. 106-116. 7 refs.

Problems of automotive emissions in the German Democratic Republic are discussed. The respective hygienic norms for lead, carbon monoxide, and hydrocarbons have been exceeded despite the relatively low traffic density. The Pb, CO, nitrogen dioxide, nitric oxide, and hydrocarbon emissions increase nearly linearly with traffic density. A decrease of 15% in automotive emissions can be expected from the necessary measures of immediate effect. Due to the high proportion of idling in city traffic, proper idling adjustment is of main concern. Carbon monoxide content as a function of different air ratios in a diagram. All engines should be designed and adjusted to run reliably without excess fuel. The international threshold of 4.9% by volume of CO when idling is exceeded by almost every second car. A decrease of about 2.5% by volume can be obtained by proper idling adjustment. The direct connection between the amount of fuel injected and the smoke density is shown for Diesel engines. Heavy smoking is primarily caused by fuel injections being too abundant. An excessive amount of smoke is emitted by every third truck at the present time. The effective Pb and CO concentration cannot be expected to lie below the hygienic limits in the years to come in socialist countries.

58024

APTIC NO. 84491

Lednicka, J.

EMISSION PROBLEMS OF SMALL AND MEDIUM-SIZED POWER PLANTS. (K problematice exhalaci z malych a strednich topenist). Text in Czech. Ropa Uhlir, 14(12):687-696, Dec. 1972. 6 refs.

Czechoslovakia produces the most ashes in the world per capita (0.72 Mg/person); however, in practical usage of these ashes Czechoslovakia is the lowest in the world (0.9 million Mg). Damage caused by industrial emission totaled up to 22-27 million dollars in the year 1962. The best fuel for Czechoslovakia as far as health and economic feasibility is concerned, is coke. Czechoslovakia has an unreasonably high standard for sulfur dioxide. It is seldom adhered to. For the atmosphere to be improved, fuels with low amounts of sulfur should be used and more efficient power plants should be built. Dispersion of the emissions is important as far as the health of the people is concerned. This can be achieved by building smoke stacks that are tall enough. Different atmospheric conditions must be taken into consideration. Power plants should be built away from residential areas.

58025

APTIC NO. 82006

Medved, L. I.

CIRCULATION OF PESTICIDES IN THE BIOSPHERE.

Pure Appl. Chem., vol. 42(1-2):119-128, 1972. 32 refs.

The Soviet Union has over 500 laboratories for systematically estimating pesticide residues in plant and animal products, water, atmospheric air and working area air. Establishing timing between the last pesticide application and harvest of the crop is of particular interest. It prevents intolerable pesticide residues in foods. Sanitary standards for the distance between target and populated areas have been established. The capacity of pesticides storage in food chains has been determined. The main pesticide accumulator is soil, from which chemicals transfer through root systems into plants. Pesticides migrate from soil to water and air. A secondary pollution risk is possible. Only a fraction of pesticide chemical is placed on target areas. The rest of the aerosol is carried away by the wind to higher atmospheric layers, resulting in deposition. It is necessary to select pesticides to preclude any prolonged, persistent, and stable preparations. (Author abstract modified)

58026

APTIC NO. 44240

Moeller-Klepzig, Christian

DOMESTIC HEATING AND PROTECTION OF THE ENVIRONMENT.

(Hausbrand und Umweltschutz). Text in German. Energie Tech., 24(6):195-197, June 1972. 17 refs.

Problems of air pollution from domestic heating and adequate control measures are described. Some 94% of the total fuel for household needs is consumed between October and April, which results, due to the high population density, decreased wind velocity, low chimneys and high inversion incidence, in elevated pollution levels during the winter months. Sulfur dioxide, dust, carbon monoxide, nitrogen oxides, hydrocarbons along with 3,4-benzopyrene, aldehydes and fluorine may be emitted from domestic heating equipment. Sulfur dioxide concentration measurements in cities revealed high SO₂ concentrations in winter as compared to the summer. The maximum allowable daily mean of 0.4 mg/cu m was frequently exceeded by more than 100%. Recent investigations revealed that the acceptable threshold concentration is 0.3 mg/cu m over 3-4 days and 0.115 mg/cu m over one year, while even lower values apply to the combination of SO₂ and respirable dust. Waste gas desulfurization for domestic heating equipment is not technically or economically feasible, which underscores the need for low-sulfur fuel and adequate, properly maintained heating equipment as well as the extensive use of natural gas, electricity, and long-distance heating. The use of such forms of energy should be required for new projects.

58027

APTIC NO. 49999

Muroki, Takumi

CHARACTERISTIC OF ROTARY ENGINE EMISSION, AND ITS CONTROL MEASURES. *(Rotari enjin no haikigasutokusei to sono taisaku). Text in Japanese. Nainen Kikan (Internal Combust. Engine)*, 11(131):149-156, Nov. 1972.

In a rotary engine, the mixture gas in the combustion chamber flows from the compression side to the expansion side. Accordingly, the flame does not reach the compression corner, so that HC hydrocarbons are more likely to be generated there. In addition, the wall surface around the compression section is quenching giving HC emission. The fundamental emission characteristics of a rotary engine are qualitatively the same as a reciprocating engine, except that HC and nitrogen oxide emissions differ in concentration level from those of a reciprocating engine due to the special combustion system of the rotary engine. The carbon monoxide, HC, and NO_x emissions were examined in relation to the air/fuel ratio. Hydrocarbons were three times higher compared with a reciprocating engine, while NO_x was a third as much. Theoretical formulas designed to justify generation of HC and the existence of unused oxygen peculiar to a rotary engine have been

developed. As a result it has become clear that the emission includes 1.6% CO, 2.5% O₂, and 530 ppm HC even when the air/fuel ratio is 15 or higher than the theoretical ratio. The CO concentration is higher than the theoretical value when concentration of O₂ remaining in the exhaust gas is higher; the CO concentration is lower than the theoretical value when the HC concentration is greater. A detailed study on effects of ignition timing and combustion chamber design was made. The rotary engine equipped with an air injection-type thermal reactor was tested to find that the best result for removal of CO and HC was obtained at an air/fuel ratio of 14-13. But the NO_x level remained unchanged even with use of the air injection-type thermal reactor.

58028

APTIC NO. 48781

Norpoth, K., G. Manegold, R. Bruecker and H. P. Amann

INVESTIGATIONS ON THE PROBLEM OF THE RELEASE OF ALKYLATING COMPOUNDS IN THE COURSE OF THE SMOULDERING PROCESS.

(Untersuchungen zur Frage der Emission alkylender Verbindungen bei Verbrennungsprozessen). Text in German. Zentralbl. Bakteriell. Parasitenk. Infektionskr. Hyg.: Abt. 1: Orig., Reihe B, 156(4-5):341-352, 1972. 14 refs.

Automobile exhaust gases and fumes resulting from limited-aeration smoldering of plastics, paper, and cellulose at temperatures ranging from 300 to 500 C were collected in organic solvents. When the washing fluid was concentrated and subsequently analyzed by various chromatographic separating methods, eight of the nine plastics examined, paper, cellulose, and exhaust gases produced or contained substances which react in the same manner with nucleophilic chromogens as do alkylating compounds. These results are discussed in connection with the possible hazard to health arising from the presence of alkylating carcinogens contained in the air of industrial areas. It is possible to concentrate the compounds detected, in order to submit them to biological examination for their carcinogenic activity. Such methods, as well as further improvement of the trace analysis of volatile alkylating substances should be able to provide a base for estimating the specific risk of toxicity, inherent in alkylating agents present in the air, to the community.

58029

APTIC NO. 84364

Pasceri, Ralph E.

A MOTOR VEHICLE EMISSIONS-MONITORING AND INSPECTION SYSTEM. In: *Air Quality Instrumentation. Selected Papers from International Symposia, presented by the Instrument Society of America*, John W. Scales (ed.), Vol. 2, Pittsburgh, Pa., Instrument Society of America, 1974, p. 73-85. 4 refs. (Presented at the Instrument Society of America Conference and Exhibit, Annual, 27th, Oct. 1972.)

An automated system for dynamic testing of vehicle exhaust emissions in New Jersey state motor vehicle safety inspection stations is described. The monitoring and inspection system consists of four subsystems: a monitoring console, a drive-aid and pass-fail panel, an exhaust induction console, and a dynamometer. A teletype is also available for program changes and data input/output functions. The system is controlled by a 4096-word mini-computer which performs data acquisition, analysis, results presentation, calibration checks on analyzers, and key system function monitoring. The system is designed primarily to measure vehicle exhaust mass emissions of carbon monoxide, hydrocarbons, nitric oxide, and smoke as opacity. Absolute system accuracy is an estimated + or - 8% of full scale based on operation over the test cycle used by the state of New Jersey.

58030

APTIC NO. 48795

Quick, Willem C. J. and J. Collins

ISOMERIZATION OF LIGHT HYDROCARBONS AND SUBSEQUENT SEPARATION BY MEANS OF MOLECULAR SIEVES. *(Isomerisierung von leichten*

Kohlenwasserstoffen und anschließende Trennung mit Molekularsieben. Text in German. *Erdoel Kohle (Hamburg)*, 25(12):706-711, Dec. 1972. 17 refs. (Presented at the Deutschen Gesellschaft fuer Mineraloelwissenschaft und Kohlechemie und the Oesterreichischen Gesellschaft fuer Erdoelwissenschaften, Nuernberg, West Germany, Oct. 4, 1972.)

Lead reduction in motor gasoline results in a lower motor gasoline octane number. Compensation can be achieved by improving the quality of various gasoline components such as the C5/C6 fraction. Isomerization, multi-stage fractionation, and molecular sieve separation can be applied to upgrade low octane (approximately 70 research octane number) straight run C5/C6 tops. Various commercial isomerization processes are discussed including the Shell Hysomer process using a rigid, noble metal loaded molecular sieve catalyst. The octane potential of isomerization processes can be increased to about 90 research octane number by separating the uncovered n-paraffins from the product and recycling to the isomerization unit. The Union Carbide Isovis commercial process is suitable for this separation. Complete integration - total isomerization process - of the Hysomer and Isovis processes is possible. Compared to a setup with independent isomerization and n-paraffin separation units, integration results in a 15-20% reduction in investment and operating costs.

58031

APTC NO. 76210

Rentz, O.

EXHAUST GASES AND DUST IN FERROALLOY OPERATIONS. (Abgas und Staubauswurf in Ferrolegerungsbetrieben). Text in German. In: *Met. Ferrolegerungen*, 2nd ed., Georg Volkert (ed.), Berlin, West Germany, Springer Verlag, 1972, Chapt. 6, p. 228-238. 40 refs.

Gaseous and particulate emissions generated in ferroalloy production, and methods for their control are described. Carbon monoxide, hydrogen, and small quantities of hydrocarbons are the basic gaseous components of the waste gases. The waste gases entrain particulate matter generated by friction between air and burden, and by evaporation of the burden. The composition of the particulate emission is determined mainly by that of the burden. Oxides of silicon, chromium, iron, aluminum, manganese, magnesium, zinc, silicon carbide, calcium carbide, phosphorus, and carbon are the principal dust components. The particulate emission amounts to 0.5-3 g/N cu m from open furnaces, and to 8-37 g/N cu m from closed furnaces. Particulate matter can be separated by bag filters, but the use of this method is currently hindered by the strong adhesion of the dust and by the high temperature of the flue gases relative to the operating temperatures of the filter materials currently available. Electrostatic precipitators, possibly requiring flue gas conditioning by means of air, sulfur trioxide, ammonia, or water, can insure residual dust concentrations of 100-150 mg/cu m. Venturi scrubbers, foam scrubbers, and disintegrators have rather low efficiency and entail high pressure losses.

58032

APTC NO. 49730

Roberts, John W., August T. Rossano, Pete B. Bosserman, George C. Hofer, and Harry A. Watters

THE MEASUREMENT, COST AND CONTROL OF TRAFFIC DUST IN SEATTLE'S DUWAMISH VALLEY. Preprint, *Air Pollution Control Assoc., Pittsburgh, Pa., Paper AP-72-5*, 33p., 1972. 38 refs. (Presented at the Air Pollution Control Association Pacific Northwest International Section Annual Meeting, Eugene, Oreg., Nov. 15-17, 1972.)

Emission factors were obtained for vehicles traveling 10, 20, and 30 mph on gravel and dusty paved roads to assess the impact of such traffic on air quality in the Duwamish Valley. A cascade impactor was used to determine the size distribution of the dust. Each vehicle mile at 20 mph on unpaved roads contributed 8.5 lbs of dust to the air with 27% below 10

micron. The quality of suspended particulates coming from the wheels was more than 3000 times the estimated tailpipe emission. Three to eight percent of the respirable dust was silica which is potentially toxic. A pollution inventory for dusty paved roads, unpaved roads, and parking lots were produced by using emission factors and measurements of mud carried on tires and under fenders. Nineteen miles of gravel roads contributed 2500 tons/yr of particulates with 700 tons below 10 micron. Two hundred and seventy tons/yr of mud are carried out of 5800 parking spots. Gravel roads, wet or dry, are a source of air and water pollution. The costs of paving roads can be financed from the savings in road maintenance. The cost of removing solids in the sewer system would be reduced because of the reduction in mud carryout. The control of traffic dust appears to be the lowest cost method of achieving air quality goals and making air resources available for economic development. It was concluded that clean streets can lower the cost of having clean air and water (Author abstract)

58033

APTC NO. 43077

Stubbs, R. I.

SOURCES OF LEAD IN THE ENVIRONMENT. Preprint, *Zoological Society of London (England)*, 6p., 1972. (Presented at a Conference on Lead in the Environment, London, England, Jan. 27, 1972.)

The processing and current uses of lead and ways that it may enter the environment are reviewed. Several factors concerning world consumption and the situation in Great Britain are also given. Lead may enter the environment from primary and secondary smelting operations, from fabricating processes, from the combustion of coal and other natural products, and in the disposal of materials incorporating lead products. Lead smelting was once the main source of lead released into the atmosphere, but smelting processes and the control of fumes have been greatly improved. Lead fabricating operations are conducted at low temperatures with little risk of fume formation. The uses of lead fall into two groups: those in metallic form and those in the form of chemical compounds. The most important metallic uses of lead are for batteries, cable sheathing, sheet and pipe, alloys, lead shot, and a large number of minor miscellaneous applications. The most important lead compounds are the oxides for lead batteries, followed by lead additives for gasoline, lead pigments, and many lead chemicals used in the manufacture of plastics, glasses, glazes, and other products. In many of these uses lead compounds result in lead being released into the environment, mainly the use of lead additives in gasoline.

58034

APTC NO. 50290

Sullivan, James B. and A. Montgomery

SURVEYING HIGHWAY IMPACT. *Environment*, 14(9):12-20, Nov. 1972. 55 refs.

A survey was conducted of 76 final 102 environmental impact statements, filed through June 1972, for proposed urban highway projects within cities of more than 50,000 population. Thirteen percent of all statements filed to mention the problem of highway-generated air pollution, while another group contained questionable assertions regarding environmental, social, cultural, and economic effects of would-be highways. Contrary to the frequently asserted relief of congested by new highways, urban highways only temporarily speed up and smooth out the flow of traffic. In the long run, they induce a larger number of people by bus and use automobiles, which will lead to renewed congestion, and hence to an increase in the overall background pollution level in highway areas. Carbon monoxide emissions from vehicles traveling on uncongested highway drop about 40% as the speed is increased to 30 mph, then increase greatly to over twice the 20 mph level as speed is increased to 70 mph. Hydrocarbon emissions change very little, dropping off slightly as speed is increased to 30-40 mph, then increasing slightly as speed is further increased to 70 mph. Nitrogen oxide emissions increase drastically with speed. Smoothly flowing traffic at 60 mph emits approximately

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nine times as much nitrogen oxide as does traffic at 20 mph. Air pollution studies indicate that suburban areas during the next decades will be subject to drastic pollution increases compared to urban centers.

58035

APTIC NO. 42054

Yahagisawa, Saburo

PUBLIC NUISANCE AND THE PROBLEMS OF EVALUATION. (*Kogai to sono keisoku ni okeru mondaiten*). Text in Japanese. Hyouunka to Hishitsu Kanri (Stand. Qual. Control), 25(5):14-17, p. 14-17. May 1972.

Fluorine causes injury to humans. Rice and vegetables should not contain fluorine. Lead also enters the human body through food. In the city of Tokyo, 460,000 tons of sulfur oxides per year (1967) are discharged. About 99% is from industry and 1% from automobiles and aircraft. Nitrogen oxides are discharged at the rate of 180,000 tons/yr. About 63.5% is from industry, 35.9% from automobiles, and 0.6% from aircraft. Carbon monoxide is discharged at the rate of 880,000 tons/yr. About 99.7% are from automobiles, 0.1% from industry, and 0.2% from aircraft. The transport and diffusion of pollution are mentioned.

58036

APTIC NO. 38457

REMOVAL OF PLASTIC WASTE CONTAINED IN THE REFUSE. (*Besteitung der Kunststoffe im Muell*). Text on German. Kunststoffe, 62(2):98-99, Feb. 1972. 5 refs.

In the German Federal Republic, the total domestic refuse quantity amounted to 13-22 million tons in 1970. The plastic percentage contained in this refuse quantity was 2 to 4%, equal to 0.52 million tons; 0.2 to 0.7% consisted of polyvinyl chloride. About 20% of the domestic refuse is burned in 38 incineration plants having a capacity from 3 to 100 tons/hr. The combustion of plastic waste leads to corrosion and erosion in the incineration plants because of the developing flue gases and dust. These can be avoided by simple technical control measures of the combustion process. The percentage of gaseous hydrogen chloride which develops when burning polyvinyl chloride has been overestimated in the past. Tests performed in Hamburg showed that the admissible emission values are only reached when raising the percentage of polyvinyl chloride contained actually in the refuse by 8 to 10 times. Another test was made at Vienna where 6% of plastic waste was added to the quantity contained normally in the refuse and was burned in a rotary shaft furnace. The content of HCl in the flue gas emitted was only 1/200 of that theoretically expected, as the HCl was absorbed by the alkaline ash substances. A quantitative classification of air pollution in the German Federal Republic showed that 5,000,000 tons of sulfur dioxide were emitted by private and public incineration plants; 8500 tons of HCl were caused by the combustion of coal; and only 8000 tons of HCl were due to the incineration of polyvinyl chloride, thus indicating that air pollution is not mainly caused by the combustion of polyvinyl chloride.

58037

APTIC NO. 43275

Environmental Protection Agency, Research Triangle Park, N. C., Office of Air Programs

APPENDIX. In: *Compilation of Air Pollutant Emission Factors*. OAP Pub-AP-42, p. A-1 to A-8, Feb. 1972. 3 refs. NTIS: PB 209559

The size of particles from various sources, including stationary combustion, solid waste disposal, mobile combustion, chemical processes, food and agricultural product processing, metallurgical processing, mineral products, petroleum refining, and wood processing are given. Efficiencies are given for settling chambers, cyclones, electrostatic precipitators, spray towers, scrubbers, and baghouses. Fuels, conversion factors, and nationwide emissions for 1968 are discussed.

58038

APTIC NO. 67133

Stanford Research Inst., Menlo Park, Calif.

PATTERNS OF ENERGY CONSUMPTION IN THE UNITED STATES. 229p., Jan. 1972. 62 refs. GPO

Trends in energy consumption by the residential, commercial, industrial, and transportation sectors are presented for the period 1960-1968. Growth rates vary from a low of 3.9% per year for the largest sector (industrial) to a high of 5.4% per year for the smallest sector (commercial), with industrial use remaining dominant at over 40% of the nation's total consumption. Transportation is growing almost as rapidly as the total and continues to account for about 1/4 of the total energy consumption. Residential consumption is increasing at 4.8% per year, above the overall average, and accounts for almost 20% of the total. Data are provided for the Btu consumption in each discrete application, the percent of total consumption accounted for by each application, and the growth rate between 1960 and 1968. Industrial groups individually examined include: primary metals; the chemical industry; petroleum refining; the pulp and paper industry; processes involving stone, clay, glass, and concrete products; and the food and kindred products industry.

1971

58039

APTIC NO. 81788

Bowen, R. G.

ELECTRICITY FROM GEOTHERMAL, NUCLEAR, COAL SOURCES. AN ENVIRONMENTAL IMPACT COMPARISON. Ore Bin, 33(11):197-209, Nov. 1971. 11 refs.

The environmental impact of producing electricity from geothermal sources is compared with that associated with coal and nuclear power sources. Geothermal steam plants operate without combustion and emit no appreciable quantities of deleterious products. The steam has an average content of 99.5% water. About 90% of the non-condensable gas portions consists of carbon dioxide. Lesser amounts of methane, hydrogen sulfide, and other trace gases are present. Fossil fuel plants produce large amounts of fly ash, carbon dioxide, nitrogen oxides, and sulfur oxides. Nuclear plants emit radioactive gases, mostly tritium. Prior to entering the reactor cycle, large amounts of radioactive radon gas are released from the mining and milling operations. In addition to the environmental advantages associated with geothermal electricity production, plant construction costs are about 2/3 to 3/4 those of fossil fuel plants and less than half that of a nuclear plant.

58040

APTIC NO. 84485

Buenz, P.

CAUSES, MEASUREMENTS AND LIMITATION OF PARTICULATE EMISSIONS FROM OIL-FIRED STEAM BOILERS. (*Ursachen, Messung, und Begrenzung des Feststoffauswurfes aus oelgefeuerten Dampfkesseln*). Text in German. Energie (Munich), 5(23):165-166, May 3, 1971.

Particulate solids in flue gases of oil furnaces may be classified as flue dust, which is a product of incombustible ash constituents in fuel; soot from hydrocarbon splitting during gas-phase combustion; and coke from liquid-phase cracking of fuel drops in evaporation and combustion. The evaluation, limitation, and monitoring of particulate solid emissions from oil-burning installations with respect to clean air require measuring techniques with appropriate qualitative and quantitative methodology. Research abroad in these areas demonstrate the importance of measuring techniques for determining allowable concentrations and emission controls.

58041

APTIC NO. 38150

Eisenlohr, Karl-Heinz, Karl Bratzler, Hans-Ulrich Kohrt, Kurt Thormann, Hans Ostermann, Hellmut Heidl, Rudolf Becker, and Ernst Karwat

PROCESS FOR THE DECOMPOSITION OF COMBUSTIBLE GASES. (Verfahren zur Zerlegung brennbarer Gase). Text in German. (Linde A. G., Wiesbaden (West Germany) and Lurgi Gesellschaft fuer Waerme und Chemotechnik m.b.H., Frankfurt am Main (West Germany)) W. Ger. Pat. 1,494,789. 7p., July 1, 1971. (Appl. Oct. 14, 1958, 1 claim).

The proposed method decomposes gases from the refining of fuels by washing with organic polar water-soluble absorbents like methyl alcohol or acetone into an insoluble fraction consisting of permanent gases and a soluble fraction which is reclaimed in the regeneration of the absorbent in the form of usable or marketable components (propane). The crude gas, washed and precooled with water to a temperature below 10 C is washed at below 0 C with the absorbent in several separate consecutive operations the absorbent from each consecutive washing is regenerated separately and returned. The temperature and water content of the gas stream decreases with each washing. Regeneration of the absorbent in the first washing is accomplished by cryoseparation at -40 C, in the second washing by two distilling columns. In the first of these columns the absorbent becomes the bottom fraction, and in the second the absorbent is the top fraction. In the second washing C5-, C4-, and C3-hydrocarbons as well as hydrogen sulfide and carbon dioxide go into solution. In the last washing at -60 C, regeneration is accomplished by a gradual release of pressure or by heating in two steps. In the second step, a cold inert gas acts as the regenerating agent. Carbon dioxide is removed by release of pressure from the absorbent resulting from the last washing before it is returned for reuse in the first washing.

58042

APTIC NO. 40298

Engel, Ronald E., H. Wilfried Goerke, Rauf Saygin, Arnoldo Liberti, and Jean Ternisien

AIR QUALITY CRITERIA FOR PARTICULATE MATTER. North Atlantic Treaty Organization, Expert Panel for Air Quality Criteria, Rept. 8, 314p., Nov. 1971. 397 refs.

The effects of particulate matter in the ambient air on man, materials, vegetation, and weather are discussed. This compilation of information on atmospheric particulate matter examines its sources, properties, and chemical reactions. Also examined are its effects on solar radiation and climate near the ground, visibility, materials, and vegetation. The effects of particulate matter on the human olfactory sense and respiratory system are discussed, as well as examined in terms of toxicological and epidemiological studies. Economic and social effects are also explored.

58043

APTIC NO. 81806

Hinkle, M. E.

DETERMINATION OF MERCURY IN CRUDE OILS. U. S. Geol. Surv. Prof. Pap., no. 750B:b171-B174, 1971. 10 refs.

A method for the determination of mercury in crude oils is described. The oil sample is quickly and completely oxidized in an oxygen flask, and the combustion products are absorbed in dilute chlorine water. The dissolved mercury is collected on a silver screen that is immersed in the chlorine-water solution. The screen is then heated, and the evolved mercury is measured by a mercury-vapor absorption detector. The technique is useful for detecting from 10-400 nanograms of mercury in a 0.05 ml oil sample which is equivalent to 0.2-8 ppm of mercury in oil. The time required for sample oxidation is reduced from the 30-40 hrs of older methods to 30-45 min. (Author abstract modified)

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APTIC NO. 76253

Ileri, Abdullah

AIR POLLUTION IN TURKEY AS AN EXAMPLE OF REGIONAL ASPECTS OF ATMOSPHERIC PROBLEMS. School of Public Health, Ankara (Turkey), Environ. Probl. Int. Implications, Istanbul, Turkey, 1971, p. 165-173. (July 21-28.)

Some local aspects of air pollution in Turkey, which typifies the rapidly developing nations, are examined. Air pollution in Ankara is caused mainly by dense chimney smoke and sulfur dioxide generated by incomplete combustion of subbituminous coal and lignite. The problem is similar but more acute in Istanbul, because of the daily temperature inversion. A copper smelter at Margul was the source of all SO₂ emitted into the air, destroying plant life, until an acid plant began emitting SO₂ in 1964. Sulfur dioxide emitted by a copper smelter at Maden affects air quality and presents a health hazard. A monitoring network in Ankara is described. Monthly average particulate readings obtained by high volume sampling and smoke shade methods are reported. Sulfur dioxide concentrations are reported and the hydrogen peroxide and West-Gaeke methods are compared. Both methods are influenced by other substances in the atmosphere. It is nevertheless clear that in Ankara the particulate and SO₂ levels are intolerable, especially during the winter. It is easier and less expensive to prevent air pollution by careful planning than to clean already dirty air.

58045

APTIC NO. 67124

Istock, Conrad, Jacqueline Easby, William Cooper, Harold E. Goeller, John A. Kadlec, Monte Lloyd, Gordon Mott, William W. Murdoch, Fred H. Tschirley, Robert I. Van Hook, and Mark Westoby

ECOSYSTEMS FOR HUMAN BENEFIT. In: *Man in the Living Environment. Report of the Workshop on Global Ecological Problems*. Inst. of Ecology and Wisconsin Univ., p. 92-163. 128 refs.

The prospects and problems in the management of ecological systems including self-maintaining natural ecosystems, natural ecosystems with high nutrient flow, and strongly driven systems of modern agriculture are discussed. The relationship between diversity and stability of an ecosystem and between diversity, stability, and pest control are reviewed. The effects of various toxic substances in ecosystems are described including pesticides, lead, mercury, cadmium, polychlorinated biphenyls, arsenic, nickel, beryllium, and ozone.

58046

APTIC NO. 34910

Johnson, M. L. M. and R. H. Essenhigh

THE POTENTIAL OF INDUSTRIAL FURNACES FOR CO EMISSIONS. Preprint, American Inst. Chemical Engineers, New York, 29p., 1971. 30 refs. (Presented at the American Institute of Chemical Engineers National Meeting, 70th, Atlantic City, N. J., Aug. 29-Sept. 1, 1971, Paper 38a.)

The potential for carbon monoxide emission by industrial furnaces was studied by gas analyses in the post-flame region up to 10 cm above a flat-flame burner situated at the bottom of a 5-cm diameter chimney. High purity propane with equivalence ratios ranging from 36% fuel rich to 30% air rich was used. Only carbon dioxide was close to equilibrium in the fuel rich region. Hydrogen and CO were below equilibrium through most of the fuel rich region; oxygen and CO₂ were respectively above and below equilibrium by one to two percentage points in the air rich region. In the neighborhood of stoichiometric, and when air rich, CO concentrations were as much as a factor of 10 greater than equilibrium at the higher temperatures. As flame temperatures fell, CO concentrations decreased, converging toward the equilibrium value. Non-isothermal analysis determined that the CO reaction was first order with respect to CO concentration, insensitive to variation in oxygen concentration, with an operational activation

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energy of 16 kcal. Using operational equations, a cooling rate was determined sufficient to freeze a flame-generated composition and quench the equilibration reactions. (Author summary modified)

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APTIC NO. 84077

Komai, Y.

RESULTS OF SURVEY ON SOIL POLLUTION BY HEAVY METALS IN SAKAI CITY. (*Sakai shi ni okeru jukinzoku niyori kojoosen no chosa*). Text in Japanese. In: *Report On Crop Damage By Environmental Pollution*, p. 35-62, 1971.

Soil specimens in 4 areas in Sakai City were collected from arable fields and the contents of zinc, manganese, iron, and lead were determined. The difference of metal content was most conspicuous for zinc. Soil samples taken from non-arable fields showed that the zinc content was smaller as the depth of sample-taking was greater. This zinc pollution of soil was thought to be the result of air pollution.

58048

APTIC NO. 54222

Mayer, R. B., P. A. Berman, and D. D. Auld

THE ST. JOSEPH LIGHT AND POWER COMPANY PACE-60 COMBINED-CYCLE PLANT. *Proc. Am. Power Conf.*, vol. 33, p. 484-491, 1971. 2 refs.

The Westinghouse PACE-60 Combined Cycle Power Plant is a complete power and steam generating plant designed for applications where both electric power and steam are required. It does not include a steam turbine, as the steam is fed to existing plants for sale as heating steam or for use in existing steam turbines. The plant, as applied at the St. Joseph Light and Power Company, produces approximately 60 mw of electric energy at base load and 226,000 lb/hr of steam at 900 F, 900 lb. No supplementary firing is used between the gas turbine and the heat recovery steam generator. The plant utilizes the Model W-501G gas turbine. The turbine drives a hydrogen-cooled generator designed in such a way that it is packaged and installed with the same centerline elevation as normal gas turbine generator stations with air-cooled generators. The steam generator is packaged to a high degree. Operating personnel may be kept to a minimum as all alarm information and control is available to the plant operator at one location. The prepackaged components enhance combined-cycle application by providing relatively low installed costs. The use of combined-cycle systems aids in reducing water and air pollution.

58049

APTIC NO. 35948

Mortstedt, Sten-Erik

AUTOMOBILE EXHAUST GASES. (*Bilavgaser*). Text in Swedish. *Lakartidningen*, 68(28):3240-3249, 1971.

Investigations of the traffic pattern were carried out in cooperation with institutes in West Germany. The test method applied is summarized. Comparison is made between the emissions by traditional and system cars (i.e., cars equipped with exhaust gas cleaning devices according to 1968 U. S. regulations), and a considerable reduction in the amount of carbon monoxide and hydrocarbons emitted is stated for the latter cars. Proper idling adjustment is important for the reduction of pollutants up to a speed of about 50 km/h. Crankcase contains large amounts of hydrocarbons. Tests were made to investigate the possibility to control carbon monoxide emissions of older cars. A number of Bosch-type smoke test instruments were tested, and Bosch and Hartridge values were compared. English test data were used. Also, odor tests were carried out; the exhaust gases from gasoline engine powered cars have stronger odor than these emitted by diesel engines. Many tests were carried out to determine nitrogen oxides (nitric oxide and nitrogen dioxide) present in exhaust gases. Organic lead compounds were investigated in exhaust gases and in street air, and adequate methods were developed for such investigations in Sweden. Pollutants from exhaust gases were investigated in street air (carbon monoxide measurements in points of high

traffic density in Stockholm and Goteborg). Test data are furnished for carbon monoxide, dust, sulfur dioxide, soot, and nitrogen oxides. The present investigations will have to be continued, and limit values will probably be set for all motor types and fuel sorts.

58050

APTIC NO. 41321

Nozu, Seiichiro

HIGH TEMPERATURE COMBUSTION CHAMBER FOR THE TREATMENT OF VARIOUS WASTES. (*Kakushu haikibutsu shoriyo koon shokyakuto ni tsuite*). Text in Japanese. *Nenryo Oyobi Nensho (Fuel and Combustion)*, 38(6):562-566, 1971.

A high temperature, melting-type combustion chamber having a furnace bed area of 0.25 sq m and a height of 1.3 m was used in test of the combustion of plastics. First, 27 g of polystyrene, 30 g of polyethylene, 24 g of polystyrene, and 65 g of polyvinyl chloride were burned at 1000, 1000 C, 500 C, and 1000, with 15%, 20%, 20%, and 50% excess air, respectively. The flue gases were clean except at lower temperatures. Better design of the combustion chamber could be obtained by considering the load of the chamber, instead of the load of the furnace bed. The rate of combustion in this chamber was extremely fast, and it could be used for the combustion of the thermal setting plastics which had different burning conditions. No scattering dusts were found. More excess air is required for the combustion of various plant wastes which usually have large varieties in quality, quantity, and shape.

58051

APTIC NO. 42493

Rouse, G. E. and D. N. Stevens

THE USE OF SULFUR DIOXIDE GAS GEOCHEMISTRY IN THE DETECTION OF SULFIDE DEPOSITS.

Preprint, *American Inst. of Mining, Metallurgical and Petroleum Engineers (AIME)*, New York, 24p., 1971. 9 refs. (Presented at the American Institute of Mining Metallurgical and Petroleum Engineers, Annual Meeting, New York, March 3, 1971.)

The use of gases emitted from an ore body as a means of detecting that ore body is developing as a major frontier in geochemical exploration. Anomalies of sulfur dioxide and other gases were defined by direct measurement around various sulfide bodies. These readings were made in soil gas and in the atmosphere from both ground vehicles and, to a limited extent, from helicopters. Test areas included porphyry copper and molybdenum deposits, systems of sulfide-bearing veins, pyrite zones associated with sandstone uranium accumulations, and pyrite-bearing mine dumps. Depending on local conditions, background values of SO₂ in soil gas and the atmosphere range from 1-15 ppb. Using present techniques, anomalous readings are recognized at approximately two times the background. The existence and magnitude of SO₂ anomalies around sulfide-bearing deposits is a function of geology, target size, soil moisture, and climatic conditions such as temperature and temperature changes, barometric pressure, wind velocity, and precipitation. Industrial SO₂ pollution can effectively mask the presence of the anomalies sought. Although it is premature to compare the advantages and limitations of this exploration method to other remote sensing techniques, the approach appears to have very substantial potential for finding undiscovered ore deposits in a variety of geologic terrains. (Author abstract modified)

58052

APTIC NO. 81840

Schweitzer, E. D. and D. H. Heller

CONTINUOUS MONITORING OF GASEOUS SULPHUR EMISSIONS AT ALPULP. *Canadian Pulp and Paper Assoc., Technical Section, Can. Pulp Paper Assoc. Pac Coast Western Branches Jt. Meet., Victoria, 1971, p. T88-T93. 4 refs. (June 3-5, Paper T88.)*

A continuous monitoring system that produces accurate sulfur dioxide and total reduced sulfur compound emission results

for all emission points found in a typical kraft pulp mill is described. The basic components of the system are two coulometric titrators, a combustion furnace, and a special probe system. The probe sample can be split, with one stream being scrubbed clean of SO₂ and measured for hydrogen sulfide. The second stream can be oxidized and measured for total sulfur as SO₂. The actual SO₂ content can then be determined as the difference. This arrangement produces simultaneous recordings of H₂S and SO₂ concentrations. The probe sample can be oxidized and all reduced sulfur compounds measured as SO₂. This latter procedure is sufficient if no naturally occurring SO₂ is found outside the recovery boiler area.

58053

APTIC NO. 49874

Snyder, Robert B., Donald J. Wuebbles, John E. Pearson, and Benjamin B. Ewing

A STUDY OF ENVIRONMENTAL POLLUTION BY LEAD (FINAL REPORT). Illinois Univ., Urbana, Dept. of Engineering and Illinois Inst. for Environmental Quality Contract 10.016, Rept. IIEQ-71-7, 162p., Nov. 1971. 126 refs.

NTIS: PB 205239

Current literature about lead in the environment and data obtained from cities and governmental agencies of the State of Illinois are reviewed. Sources of lead in the environment include the decay of uranium-238, minerals, volcanoes, forest fires, silicate dust, sea salt, primary mining, smelting, refining, secondary metallurgical recovery, storage batteries, paint, incineration, automotive exhausts (from tetraethyl lead additives), and other industries. Atmospheric lead values have increased in recent years. In 1965, atmospheric lead values ranged from 0.3 micrograms/cu m in suburban areas to 44.5 micrograms/cu m in a tunnel; the annual means in the cities tested were less than 3 micrograms/cu m. In 1970, levels as high as 71.3 micrograms/cu m were found in Los Angeles County and daily averages of 8 micrograms/cu m in San Diego. Lead concentrations in Cook County, Ill. in 1969 ranged from 0.10-3.18 micrograms/cu m compared to marine atmospheric values of 0.0003 to 0.0015 micrograms/cu m. The amount of lead near a highway is especially large due to automobile exhaust. Lead concentrations in arctic snow, surface soil, water, and food have also increased. About half the lead particulates reaching the lungs are deposited and retained. Particles over 5 micron in diameter are primarily deposited in the nose and throat, while those smaller than 1 micron are deposited in the alveoli. Approximately 95% of the particles emitted by automobiles are less than 0.5 micron in diameter. Urban residents tend to have a much larger mean blood level of lead than rural residents. Health effects, toxic tolerance, body burden, enzyme effects, symptoms of plumbism, susceptibility, metabolic and functional effects, chronic illnesses, and other factors of lead toxicity are discussed. People are being subjected to lead concentrations in food and urban air which are not far below those levels which result in overt symptoms of plumbism. Lead analytical methods, include X-ray fluorescence, the dithizone colorimetric method, atomic absorption spectroscopy, anodic stripping voltammetry, and optical emission spectroscopy. Control methods are outlined including use of no- or low-lead fuels, baghouses, electrostatic precipitators, cyclonic separators, wet scrubbers, and water treatment.

58054

APTIC NO. 33151

Wilck, A. -F., E. Didion, and A. Ihrenberger

OPERATING EXPERIENCES WITH A QUICK-START BOILER FOR COVERING PEAK DEMANDS IN AN INDUSTRIAL POWER PLANT. (Betriebs Erfahrungen mit einem Schnellstartkessel zur Abdeckung der Spitzenlast in einem Industriekraftwerk). Text in German. Mitt. Ver. Grosskesselbet., 51(4):301-311, Aug. 1971. 4 refs. (Presented at the Vereinigung der Grosskesselbetreiber Hauptversammlung, Munich, Germany, June 30, 1971.)

AIR POLLUTION ABSTRACTS, JUNE 1976

The quick start boiler using low-sulfur fuel for covering peak demands in an industrial power plant is examined. The combustion process, primarily the primary and secondary air supplies, was controlled by television cameras to guarantee satisfactory combustion. If the normal water level in the boiler was exceeded, the surplus entered a cyclone and was separated from the steam which was emitted into the atmosphere. The cameras in the combustion chamber were used as continuous monitoring devices of carbon monoxide, carbon dioxide, and flue gas, but no measurements were taken.

58055

APTIC NO. 73557

Wixson, Bobby G., Ernst Bolter, J. Charles Jennett, and Krishnair Purushothaman

ENVIRONMENTAL IMPACT OF TRACE METALS ON THE NEW LEAD BELT OF S.E. MISSOURI. Preprint, American Geophysical Union, Washington, D. C., 13p., 1971. 6 refs. (Presented at the American Geophysical Union Fall National Meeting, San Francisco, Calif., Dec. 6-9, 1971.)

The environmental impact of trace metals emitted from a lead smelting operation in the lead belt of southeast Missouri was investigated by performing trace analyses of dust fall samples and obtaining wind rose information. The prevailing wind from the west-northwest to northwest direction was responsible for the largest dust fall in the fall, winter, and spring seasons, while during the summer the maximum trace metal distribution occurred at stations in the prevailing wind direction. Lead, copper, iron, zinc, and cadmium values ranged from 4.57-11.38, 0.06-0.026, 0.20-0.87, 0.03-0.38, and 0.01-0.02 g/sq m/mo, respectively. Total settleable particulates ranged from 4.98-12.89 g/sq m/mo, with the maximum occurring at a wind frequency percentage of 12.4 from the west-northwest.

58056

APTIC NO. 43067

Wright, J. H.

THE ROLE OF ELECTRIC POWER IN MINIMIZING TOTAL POLLUTION FROM ENERGY USE. Proc. Am. Power Conf., vol. 33:602-610, 1971. 11 refs.

Power generation is a factor in both the problem and the solution to the air pollution problem. The two principal types of steam electric generation plants--fossil and nuclear--emit small quantities of radioactivity and large quantities of low-grade heat. Fossil plants also emit quantities of sulfur and nitrogen oxides and particulate matter. However, the production of electric power, while using 23% of the national energy, accounts for only 13% of the air pollutants. Recent and projected improvements in power plant pollution control techniques could further reduce this figure. Transportation, which utilizes about the same amount of energy as power production, produces 60% of the air pollution in the nation. While the unit pollutant emission from energy use in process heat is about equal to that from electric power production by fossil fuel processes, the prospects for air pollution control involving thousands of small units are not as good as those for the large power plants. Increasing the role of electric power in transportation, process heat, and space heating, particularly in urban centers, could significantly reduce air pollution levels. Air pollution levels are projected to the year 2000 for both current energy usage patterns and an optimum usage of electric power.

58057

APTIC NO. 42494

Zoller, W. H., G. E. Gordon, E. S. Gladney, and A. G. Jones

THE SOURCES AND DISTRIBUTION OF VANADIUM IN THE ATMOSPHERE. Am. Chem. Soc. Div. Water Air Waste Chem. Gen. Paper, 11(2):159-165, 1971. 18 refs. (Presented at the American Chemical Society, National Meeting, 162nd, Washington, D. C., Sept. 12-17, 1971.)

The atmospheric and urban distribution of vanadium is considered. Oceans and crustal weathering are the two largest potential natural sources of atmospheric vanadium. Residual

oil combustion is considered as a source of vanadium in the Boston area. Interaction effects of vanadium on materials are mentioned. Vanadium probably follows the same removal mechanism as do many other urban aerosols, i.e., coalescence and fallout or removal by precipitation. Vanadium can be measured quite well with the use of lithium-drifted germanium gamma-ray detectors in neutron activation analysis.

58058

APTIC NO. 38344

Zutshi, P. K.

POLLUTION. (Sci. Cult.), 37(2):65-68, Feb. 1971. 5 refs.

General chemical and physical effects of pollution with particular reference to the problem in India are reviewed. Emission data on sulfur dioxide, carbon monoxide, nitrogen oxides, ammonia, hydrocarbons, and carbon dioxide indicate that although India is under average in industrialization, the population density and the industrial areas located in and around the cities cause a very high general pollution problem. Hazards from insecticides used on fruits and to control insects have become more extensive, resulting in increasing cases of poisoning. Some problems with physico-chemical pollutants and thermal pollution are also discussed.

58059

APTIC NO. 36626

AIR EMISSION INVENTORY-STATE OF ALASKA.

TRW Systems Group, Redondo Beach, Calif., Resources Research Lab., Environmental Protection Agency Contract 68-02-0048, 68p., Aug. 1971. 24 refs.

NTIS: PB 203176

The results of a statewide emission inventory performed in Alaska are summarized in the form of pie charts and tabulations for five pollutants (particulates, sulfur oxides, carbon monoxide, hydrocarbons, and nitrogen oxides) for Anchorage, Fairbanks, and air quality regions. Descriptions of the four air quality regions in the state are included, along with data on fuel usage, fuel parameters, and refuse disposal rates. The emission data were obtained from a variety of sources, including over 200 questionnaires returned from various industrial, commercial, and governmental organizations. The calculation of emissions from area sources and point sources was performed using emission factors provided by the Environmental Protection Agency. The data will be used as the basis for an air quality control strategy. Residential, commercial, and industrial sources include aircraft, fuel combustion, automobiles, diesel, railroads, solid waste disposal, open burning, incineration, power plants, and chemical processes.

58060

APTIC NO. 38461

Engineering Science, Inc., Washington, D. C.

EXHAUST GASES FROM COMBUSTION AND INDUSTRIAL PROCESSES (FINAL REPORT). Office of Air Programs Contract EHSD 71-36, Rept. APTD-0805, 436p., Oct. 2, 1971. 163 refs.

NTIS: PB 204861

An emission inventory of combustion and industrial processes was conducted to determine the extent to which operating variables and process throughput rates affect exhaust gas conditions and emission rates and to recommend exhaust gas conversion factors for use in the development of implementation plans for air quality control regions. A brief description of each industry, its operating characteristics, including input-output relation, and a process description are also included. Data on exhaust gases at stack exit with relation to gas flow rate, temperature, velocity, and stack height are presented for various processes within the combustion of coals, residual and distillate fuel oils, natural gas, liquefied petroleum gas, and wood waste; municipal, industrial, commercial, and domestic incineration; auto body disposal; open burning; chemical processing of ammonia, carbon black, charcoal, chlorine, hydrofluoric acid, nitric acid, phosphoric acid, phthalic anhydride, and sulfuric acid; manufacturing of paints, varnish,

plastics, printing ink, soap, detergents, synthetic fiber, and synthetic rubber; primary and secondary metallurgical processing of aluminum, lead, and zinc; primary metallurgical processing of copper and steel; secondary metallurgical processing of magnesium, brass, and bronze; food and feed operations, including alfalfa dehydrating, coffee roasting, cotton ginning, grain preparation, fish meal processing, fermentation, meat smokehouses, and starch manufacturing; mineral processing of asphalt, bricks, clay, calcium carbide, cement, ceramic clay, fly ash, concrete, fiber glass, gypsum, lime, perlite, mineral wool, rock, and gravel; kraft, sulfite, and neutral pulping; petroleum refining; dry cleaning; surface coating operations; and gasoline marketing. Control equipment used in the various processes included baghouse filters, electrostatic precipitators, scrubbers, cyclones, and dry collectors for particulate matter; afterburners and adsorbers for organic gases; and scrubbers for inorganic gases.

58061

APTIC NO. 40344

Engineering Science, Inc., Washington, D. C.

EXHAUST GASES FROM COMBUSTION AND INDUSTRIAL PROCESSES. Engineering Science, Inc., Washington, D. C. Office of Air Programs Contract EHSD 71-36, 431p., Oct. 2, 1971. 163 refs.

NTIS: PB 204861

Combustion and industrial processes were investigated to determine the extent to which operating variables and process throughput rates affect exhaust gas conditions and emission rates and to recommend exhaust gas conversion factors to be used in the development of implementation plans for air quality control regions. For each source category, gas flow rate, temperature, and velocity and stack height were evaluated and the operation of the industry, process description, and input-output relation were reviewed. Collection efficiencies were calculated for baghouses, electrostatic precipitators, high- and low-energy scrubbers, mechanical collectors, afterburners, adsorption methods, and scrubbers. Complete data are presented for exhaust gases from combustion of coal, fuel oils, natural gas, and wood wastes within power plants, and industrial processes; domestic heating; incineration; open burning; solid waste disposal; chemical processes; paint and varnish manufacturing; soap and detergent manufacturing; synthetic rubber and fiber plants; food and feed operations; primary and secondary metallurgical processes; sintering; mineral processing; petroleum refining; pulp mills; dry cleaning; surface coating operations; and gasoline marketing. Pollutants emitted by the various processes include solvents, alumina, copper oxides, metal fumes, chlorides, lead oxides, silica, fly ash, particulates, sulfur oxides, nitrogen oxides, sulfur dioxide, soot, chlorine gas, carbon dioxide, carbon monoxide, hydrogen fluoride, hydrogen sulfide, ammonia, organic vapors, fluorides, phosphoric acid mist, aldehydes, hydrogen chloride, hydrocarbons, zinc oxides, dusts, and odors.

58062

APTIC NO. 43014

BACKGROUND INFORMATION FOR ESTABLISHMENT OF NATIONAL STANDARDS OF PERFORMANCE FOR NEW SOURCES. PRIMARY SMELTING OF COPPER, LEAD, AND ZINC. Environmental Engineering, Inc., Gainesville, Fla. and PEDCO Environmental Specialists, Inc., Cincinnati, Ohio, Air Pollution Control Office Contract CPA 70-142, Task 2, 82p., March 15, 1971. 33 refs.

The primary nonferrous smelting industry consists of smelting copper, zinc, and lead bearing ores. Because of the high sulfur content, sulfur dioxide emissions are copious. In 1960, nonferrous smelters emitted approximately 3.8 million tons of SO₂, or 12% of the total SO₂ emissions in the nation. The main processes in the extraction of copper, lead, and zinc from their ores are dressing or concentrating, roasting, sintering, smelting and refining carried out in different types of equip-

ment, depending upon the nature of the ore and the particular plant design. Emissions from primary smelters include, in addition to SO₂, nitrogen oxides, solid particulates including toxic metals, and minor amounts of fluorides. Primary control emphasis is placed upon sulfur dioxide and particulate emission. Control technology, including electrostatic precipitators, fabric filters, SO₂ removal processes (contact, alkaline additive, absorption, Claus, and scrubber methods), and mist eliminators, is examined. Most of the SO₂ source streams are of sufficient concentration to justify sulfur value recovery. Smelting operations which control SO₂ emissions to a high degree, both those presently in use and projected designs for the future, are described. Specific regulations currently pertaining to emissions from primary nonferrous smelters are summarized, and the growth of the industry is projected to the year 1980.

58063

APTIC NO. 43538

Office of Air Programs, Research Triangle Park, N. C., Air Pollution Technical Information Center

AIR POLLUTION ASPECTS OF EMISSION SOURCES: ELECTRIC POWER PRODUCTION. A BIBLIOGRAPHY WITH ABSTRACTS. Office of Air Programs Pub. Ap-96, 312p., May 1971. 1040 refs.

GPO

Approximately 1040 abstracts were selectively screened from the contents of the Air Pollution Technical Information Center's information storage and retrieval system to cover problems of electric power production. Emission sources, control methods, measurement methods, and air quality measurements related to electric power production are included, as well as standards and criteria, legal and administrative considerations, and social aspects. Human health effects, economic effects, materials deterioration, and effects of electric power plant emissions on plants and livestock are considered.

58064

APTIC NO. 44948

Communications Dept., Stockholm (Sweden), Guidance Group Concerning Development Work in the Field of Motor Vehicle Exhaust Gas

AUTOMOBILE EXHAUST-GENERATED AIR POLLUTION (FINAL REPORT). (Luftfororeninngar genom bilavgaser. Slutbetankande). Text in Swedish. 371p., 1971. 309 refs.

Five years of developmental work by the guidance group are described, and suggestions are presented for strengthening the Swedish regulations concerning vehicle exhaust gases and for the direction of continued work in the field of motor vehicle exhaust gases. In Stockholm air samples were taken at a height of 1.5 to 2 m above the ground level for measurements on streets used by motor vehicles, and about 1 m from the edge of the pavement. Recorded peak values during half an hour varied between 33 and 56 ppm for carbon monoxide and between 0.56 and 1.50 ppm for nitrogen oxides. The concentrations of particle-borne lead, calculated as average values during half an hour, varied between 0.12 and 12.0 micrograms of lead/cu m. The amount of pollutants in kg/1000 l fuel consumed by gasoline-fueled and diesel-fueled vehicles was estimated for CO, hydrocarbons, nitrogen oxides, lead compounds, solid particulates, and sulfur dioxide. Technical measures for reduction of emissions from gasoline- and diesel-fueled vehicles were considered as well as improvement of traffic patterns and altered composition of fuels. Suggested emissions limitations for 1974-1976 model vehicles cover CO and hydrocarbons in exhaust gas, nitrogen oxides in exhaust gases, and fuel evaporation of hydrocarbons. Concerning vehicles of 1977 and subsequent models the guidance group suggests that U. S. federal regulation for 1975/1976 models vehicles should be adapted. The calculated effect of emission standards and estimated costs are presented. Emission supervision and service procedures are described.

AIR POLLUTION ABSTRACTS, JUNE 1976

58065

APTIC NO. 47569

Office of Air Programs, Rockville, Md., Federal Sources Branch

REAL PROPERTY OWNED BY THE FEDERAL GOVERNMENT IN THE STATE OF OKLAHOMA. APTD-1042, 21p., June 1971.

NTIS: PB 210000

A list of the major facilities of real property owned by the Federal Government in Oklahoma was compiled. The installations are listed by location (city); brief descriptions of the installations, operating agencies, and size classifications are included. The list only includes those installations which present an air pollution potential. (Author summary modified)

58066

APTIC NO. 47964

Bundesministerium des Inneren, Bonn (West Germany), Arbeitsgruppe Verkehr

CONTRIBUTION OF THE TRAFFIC WORKING GROUP. (Beitrag der Arbeitsgruppe Verkehr). Text in German. In: *Materialien zum Umweltschutzprogramm der Bundesregierung 1971. Umweltplanung. Lower House of Parliament, 6th Session, Document 6/2710, p. 463-507, Oct. 1971.*

Transportation-generated environmental hazards and environmental protection measures planned in the transportation area are outlined. Road traffic-generated carbon monoxide, nitrogen oxides, hydrocarbons, sulfur dioxide, and particulate emissions are expected to increase considerably during the 1969-1980 period. Nevertheless, the exhaust CO concentration decreased from 0.65 in 1959 to 0.25 kg/kg of fuel in 1969, a similar decrease in the exhaust hydrocarbon and nitrogen oxide concentrations was determined. A decrease by 20-30% in the next 3-4 years, and a further reduction to 10% in the next 8-10 years in the CO, hydrocarbon, and nitrogen oxide emissions from spark-ignition engines are envisaged. The gasoline lead content, to be decreased to 0.4 g/l in 1972, will be further reduced to 0.15 g/l in 1976. Battery-powered vehicles, designed especially for city traffic, have accelerations of 1.5-2 m/sec and an average speed of 60 km/hr. Intense research concerning the use of fuel cells for vehicles will be conducted. Short-term research projects concerning diesel engine aim at improving the combustion conditions by reducing the compression ratio and by increasing the air-excess coefficient to reduce nitrogen oxides, hydrocarbons, and CO emissions. The use of vortex chamber, pre-chamber, stepped combustion, catalysts either in the exhaust flow or inside the combustion chamber, and fuel gasification will be studied on the long run. The diesel oil sulfur content will be limited first to 0.4, and then to 0.3%. Environmental aspects of railroads, air traffic, and ships are discussed.

1970

58067

APTIC NO. 41149

Bakke, Keith A.

EL PASO METROPOLITAN AREA AIR POLLUTANT EMISSION INVENTORY. National Air Pollution Control Administration, Durham, N. C., Air Quality and Emission Data Div., Office of Air Programs Pub-APTD-0815, 61p., May 1970. 4 refs.

NTIS: PB 207689

An air pollution emission inventory of the El Paso Metropolitan Area was conducted in March 1970 for the purpose of acquiring data and furnishing emission estimates representative of the year 1969. All sources of emissions were classified into five categories -- transportation, stationary fuel combustion, solid waste disposal, industrial processes, and evaporative losses. Furthermore, each of these source categories was divided into two subgroups -- point sources and area sources. Facilities emitting large quantities of air pollutants were considered individually as point sources, while the many

remaining contributors such as motor vehicles, residential and commercial fuel users, small industries, and on-site refuse burning equipment were considered collectively as area sources. Regarding the 359,300 tons of sulfur oxides emitted, copper smelters were mainly responsible. An evaluation of particulate emission revealed that 68% of the 31,900 tons total were emitted by a foundry and a quarry. An additional 17% was emitted by the remaining process point sources. About 63% of the 344,400 tons of carbon monoxide emitted was attributed to motor vehicle exhaust. Other sources included two refineries which accounted for approximately 29%. The three largest sources of the 43,000 tons of hydrocarbons were motor vehicles (43%), automobile evaporation losses (28%), and the storage and handling of gasoline (17%). A remaining 12% was divided among industrial process sources, solid waste disposal, aircraft, and evaporative losses from dry cleaning plants. The two largest sources of nitrogen oxides were stationary fuel combustion (23%) and transportation sources (63%). A remaining 14% was emitted from solid waste disposal and process sources. Emissions were estimated by using various indicators such as fuel consumption, refuse burning rates, vehicle-miles, production data, and control efficiencies and emission factors relating these indicators to emission rates. Since individual sources have inherent differences that cannot always be taken into consideration, discrepancies between the actual and estimated emission are more likely in individual sources than in the total emissions for a source category.

58068

APTIC NO. 24483

Fritschen, Leo, Harley Bovee, Konrad Buettner, Robert Charlson, Lee Monteith, Stewart Pickford, James Murphy, and Ellis Darley

SLASH FIRE ATMOSPHERIC POLLUTION. Washington Univ., Seattle, Forest Service, Seattle, Wash., Pacific Northwest Forest and Range Experiment Station, and California Univ., Riverside, Statewide Air Pollution Research Center, Forest Service Grant 2, RP-PNW-97, 42p., 1970. 21 refs.

NTIS: PB 192342

The relationship between the current practice of slash (logging debris) burning and air pollution was studied with broadcast fires in the field (representing low-temperature fires) and laboratory and pile fires in the field (high-temperature). Ground level particulates increased to nearly 10 times the background immediately downwind from the broadcast burn, but at a distance of 19 km from the fire, the visibility had increased to the level found over Seattle. Similarly, high CO and CO₂ concentrations found at the fire site decreased rapidly to ambient conditions in horizontal and vertical directions. Hydrocarbon analyses of gas samples revealed low concentrations of 25 components. Laboratory fires showed a similar ratio of CO:CO₂. Results suggest that broadcast fires can be modeled in the laboratory with respect to burning characteristics, gaseous and particulate emission from different fuel density, packing, composition, and method of ignition. Air pollution from slash burning can be minimized by a high energy release rate fire with a strong convection column under conditions favorable for rapid atmospheric dispersion. The fire should be of short duration to consume the smaller fuels only. Information is also presented on development of an airborne integrating nephelometer, an air sampler that operates without power for use over a period of time, and the vacuum oven technique for fuel moisture determination.

58069

APTIC NO. 84479

Kowalski, Witold

EFFECT OF SURFACTANTS ON THE DECOMPOSITION OF PHOSPHATE ROCKS AND EVALUATION OF FLUORINE GAS IN THE PRODUCTION OF SUPERPHOSPHATE. (Wpływ Związków Powierzchniowych na Rozkład Surowców Fosforowych i Wydzielanie Gazów Fluorowych w Procesie Otrzymywania Superfosfatu). Text in Polish. Chem. Stos. Ser. A, 14(1): 81-89, 1970. 7 refs.

The effect of surfactant compounds on the extent of phosphorus-containing ore decomposition and fluorine release during the latter was studied. The phosphorus-bearing material under investigation was Marocco I, Marocco II, apatite and a mixture of 2 pt of apatite and 1 pt of Marocco II decomposed by sulfuric acid. The disintegration tests for any ore type were performed with and without surfactants at the same concentration and quantity of H₂SO₄, temperature, length of time and mixing speed. The amount of surfactant added was 0.02% of the total weight of the ground material used and H₂SO₄. The surfactants were of the non-ionic, anionic and cationic types. Analysis for water-soluble P₂O₅ and total P₂O₅ was carried out 3 hr, 3 and 7 days after the reagents were mixed and the decomposition level was calculated by gravimetry. Simultaneously, the degree of defluorination was determined by the balance of the fluorine content in the ore and in the end product. Its superphosphate content was evaluated 7 days after the reagents were mixed. Cationic compounds of the fatty amine group did not affect the decomposition process. The greatest effect among the non-ionic surfactants was shown by stanol, a condensation product of ethylene oxide and saturated fatty acid. In the anionic group, the strongest effect was demonstrated by sodium tetradecylbenzene sulfonate. The surfactant activity was comparatively more intensive in the decomposition of apatite than that of phosphate rock. With regard to defluorination, an addition of 0.04% stanol was the most effective raising the level by 8%. The studies indicated approaches to achieve higher efficiency in superphosphate production.

1969

58070

APTIC NO. 42470

Ireland, F. E. and E. A. Balfour Birse

ONE HUNDRED AND FIFTH ANNUAL REPORT ON ALKALI, ETC. WORKS BY THE CHIEF INSPECTORS. 1968. Ministry of Housing and Local Government (Great Britain), Scottish Development Dept., 89p., 1969. 10 refs.

This volume reports on the activities of the inspectors for air, water, and land pollution to the Secretaries of State for both Scotland and Wales. Reports concern industrial activities that involve chemicals, metals, fuels, and cement, ceramics, caustic soda, and lime. The number of works inspected due to specific complaints in Wales in 1968 was 405. Of these, 290 are works registered under the Alkali, Etc. Works Act of 1906. Complaints were most numerous against ceramics works, 32; iron and steel works, 31; gas and coke works, 30; electrical works, 30; cement works, 17; metal recovery works, 15; tar works, 15; aluminum works, 10. Area wide complaints were distributed among sulfuric acid contact plants, 4; nitric acid, 2; bisulfite, 2; chlorine, 1; lead, 2; aluminum, 1; copper, 1; and metal recovery, 2. Appendices contain the number of works registered, number of processes under inspection, averages of emission tests, sulfuric acid statistics, ammonia products, notes on hot blast cupola control, reports and recommendations of a committee on acid soot emissions, and totals of raw material consumption for Scotland.

58071

APTIC NO. 42502

Mortstedt, S. -E.

WANKEL ENGINES. (Wankel - motorer). Text in Swedish. Aktiebolaget Atomenergi (Sweden), Rept. BIL-48, 4p., Oct. 8, 1969.

Comparative investigations of a Wankel engine (NSU RO 80 model with a total stroke volume of 995 cu cm) and conventional engines are presented, with special regard to maximum power output, stroke volume, and exhaust volume. The maximum power output to stroke volume ratios for conventional four-stroke engines, representative of the Swedish car population, range from 29.5 to 57.5 HP/l, while the corresponding arithmetic mean for the investigated Wankel engine is 115.5. Two methods for converting a Wankel engine stroke volume

into an equivalent cylinder volume of a conventional four-stroke engine are presented. The comparison of the maximum power output/l of a specific Wankel engine with corresponding averages for cars with comparable maximum output shows that the output/l for a Wankel engine is 2.5 times that of an average car. The above method is based on the fact that engines with the same maximum power output, whereas the exhaust volumes under part load are different. Another comparison is based on the theoretical power output/l related to a given engine speed and compression ratio. The latter comparison shows that the output/l for Wankel engines is twice as high as that of conventional four-stroke engines.

58072

APTIC NO. 43005

Poole, W. Kenneth and Donald R. Johnston

ESTIMATING POPULATION EXPOSURE TO SELECTED METALS - TITANIUM (FINAL REPORT). *Research Triangle Inst., Research Triangle Park, N. C., National Inst. of Environmental Health Sciences Contract PH-86-65-109, RTI Proj. AU-229, 97p., March 1969. 60 refs.*

Three aspects of titanium in the environment are discussed: the flow of titanium from mining to consumption; the occupational exposure of subpopulations to titanium; and the exposure of the general population to titanium via air, food, and water. Industries which use titanium include ore processing, pigment production, metal production, and welding-rod coatings and alloy production. For each of these industries, specific processes and occupational exposure hazards are described. In the pigment plants the operations of drying, grinding, and bagging the pigment as well as those involved in the titanium tetrachloride reduction are key areas. The TiCl₄ reduction phase is also a potential problem area as regards exposure in metal work. The mining industry generally has no significant exposure problem. The estimated daily dose of inhaled titanium for the general population is 0.64 micrograms/day. Titanium concentrations in various foods are detailed. Butter, corn oil, contain significant amounts. The median daily titanium dose from drinking water in 100 cities is estimated to be 3.0 micrograms.

1968

58073

APTIC NO. 79809

Bunyard, Francis L. and John O. Copeland

SOILING CHARACTERISTICS AND PERFORMANCE OF DOMESTIC AND COMMERCIAL OIL BURNING UNITS. *Preprint, Public Health Service, National Center for Air Pollution Control, 24p., 1968. 7 refs.*

Smoke emission tests are reported for 310 oil burning units of various sizes and types, including both domestic and commercial applications. Tests were performed by oil burner service contractors located in metropolitan areas across the nation. Based upon predetermined criteria, only good units were selected for testing. Units were tested for Smoke Spot Number and efficiency before and after adjustment. Other readily available data are also included. Smoke Spot Numbers can generally be reduced without loss of efficiency. It may be practical to reduce air pollution from oil fired units based upon Smoke Spot Numbers. (Author abstract)

58074

APTIC NO. 32060

Chambers, Leslie A.

CLASSIFICATION AND EXTENT OF AIR POLLUTION PROBLEMS. *In: Air Pollution. Arthur C. Stern (ed.), Vol. 1, 2nd ed., New York, Academic Press, 1968, Chapt. I, p. 1-21.*

This history of air pollution is discussed, including natural causes, decaying refuse, and wood smoke. The use of coal from the beginning of the 14th century to the early part of the 20th led to air pollution by coal smoke and gases. Various English kings, legislation, and committees attempted to regulate its use. In 1952, the death of 4000 persons in London led to

strict controls. Smog also caused deaths in England. In America, the incident at Donora, Pennsylvania spurred pollution control efforts. In Poza Rica, near Mexico City, hydrogen sulfide caused deaths and illness. Other pollutants, such as metallic fumes, acid mists, fluorides, and odors, have also caused health problems. While oil and gas have replaced coal, they have caused further pollution. Evidently, photochemical reactions in automobile engine exhausts have caused Los Angeles smog. Air pollution is directly related to energy sources; a major change in energy sources could change the quality of air pollution. Carbon dioxide in the atmosphere has increased with the use of fossil fuels. Pollutants can be emitted directly from identifiable sources or can be produced in the air by an interaction between two or more primary pollutants, or by a reaction with normal atmospheric constituents. The first group includes aerosols, coarse particles, and sulfur, organic, nitrogen, carbon, halogen, and radioactive compounds. Secondary pollutants include halide salts, sulfuric acid mist, photochemical reactions, and the absorption of gases by surfaces of liquid and solid particles. Nucleation, condensation, sedimentation, and meteorological processes also effect the formation and impact of primary and secondary pollutants. Air pollution can cause a reduction in visibility, material damage, agricultural damage, physiological effects on man and domestic animals, and psychological effects. Air pollution will be a larger problem in the future. Its emergence as a global phenomenon will effect many governmental and administrative procedures.

APTIC NO. 82703

58075

Mikhel'son, M. L., A. A. Malevich, L. I. Filippenko, and L. M. Levitskaya

INVESTIGATION INTO THE DISPERSION COMPOSITION OF THE AEROSOL PARTICLES FORMED IN BASIC OXYGEN STEELMAKING. *(Issledovanie dispersnogo sostava sostava aerolov nykh chastits, obrazovannykh pri konvertirovanii proizvodstve stali s kislorodnoy prodvukoy). Text in Russian. Zavodsk. Lab. (Moscow), 34(8):984-986, 1968.*

The dispersion of dust particles produced in a Russian basic oxygen furnace was studied by optical, ultra-, and electron microscopy. Variations in the weight concentration of dust were observed during blows. Differential curves were investigated based upon use of the adhesion and dissolution methods. Electron microscope films were made of specimens obtained by both methods. The obtained values of the calculated concentration of aerosol particles determined with optical, ultra-, and electron microscopy corresponded to (0.2-0.6), (3-25), and (25-200) times 10 to the 6th particles/cu cm and were, therefore, a function of the type of instrument employed.

58076

APTIC NO. 82347

Yamaga, Joji

SAFETY AND AIR POLLUTION IN AUTOMOBILE TRAFFIC. *Text in Japanese. Kagaku Kogaku (Chem. Eng.), 19(7):87-91, July 1968. 2 refs.*

The rapid increase of automobiles in Japan has been accompanied by many hazards, including air pollution. Driver and safety education, automotive engineering, and enforcement of traffic regulations are discussed. Air pollution, particularly from carbon monoxide, hydrocarbons (HC), and nitric oxide and nitrogen dioxide is discussed. Carbon monoxide has been especially prevalent at congested intersections. A survey conducted at a Tokyo intersection revealed CO levels of 4.1 ppm (average) to 22 ppm (maximum) compared to the maximum allowable environmental health standard of 10 ppm. Ten m away from the intersection, the pollution count dropped to one fifth or one tenth of that at the intersection, suggesting that localized air pollution can be drastically reduced by replacing intersections with underpasses and overpasses. Although no serious smog threat exists in Tokyo, the increase in HC and oxides of nitrogen, which are chiefly responsible for smog in Los An-

geles, cannot be ignored. Improvement in automobile engine construction is imperative to reduce air pollution. Complete engine combustion can decrease CO and HC, but a combustion heat of 600 C is conducive to the formation of NOx. It is not economically feasible to expect electric automobiles to emerge as a solution to air pollution for at least another decade. (Author abstract)

1967

58077

APTIC NO. 82711

Lutsenko, V. T. and P. V. Umrikhin

THE AMOUNT AND COMPOSITION OF THE DUST PRODUCED WHILE MELTING STEEL IN THE BASIC ELECTRIC FURNACE. (O kolichestve i sostave plavil'noy pyli pri vyplavke stali v osnovnykh elektropetchakh). Text in Russian. Izv. Vysshikh Uchebn. Zavedenii Chernaya Met., vol. 1:69-73, 1967. 5 refs.

The possibility of lowering the iron losses and the formation of brown fumes and dust in electric arc furnace operation, with and without the use of oxygen, was explored in a laboratory as well as under industrial plant conditions. In the laboratory, the amounts and chemical composition of dust samples collected from a half-ton furnace were studied to determine the nature of dust formation. In the industrial scale investigation a 7-ton capacity arc furnace producing plain carbon, low alloy and high-manganese steels with the use of oxygen during melt-down and oxidizing periods, the dust produced with and without oxygen was analyzed for its particle size and chemical composition. The results of both studies indicated large losses of iron with smelting dust, especially during the smelting of steel in basic arc furnaces when oxygen is used. Dust formation was decreased when oxygen was introduced into the metal beneath the slag, a condition that can be ensured with accelerated, early slag formation.

58078

APTIC NO. 42477

Mortstedt, S. -E.

TEST REPORT ON CRANKCASE GASES. (Provningsrapport beträffande vevhusgaser). Text in Swedish. Aktiebolaget Atomenergi (Sweden), Rept. BIL-5, BA-SSL-246, 7p., Feb. 1, 1967. 1 ref.

Chassis dynamometer tests were carried out on a Volvo B 18 A type motor built in Volvo Amazon to determine volume and composition of the crankcase gases. Constant drive test at idle, in first, second, third, and fourth gears, as well as California test and European cycle test were performed, and carbon monoxide, carbon dioxide, hydrocarbon, and oxygen contents were determined, and the fuel consumption was measured. The crankcase gas investigated during constant drive tests at idle contained 0.2% CO, 6400 ppm hydrocarbons and had a total volume of 2.4 l/min. The proportion of the exhaust gas in the crankcase gas accounted for 12.4% by volume, while the corresponding value for the first through fourth gears ranged from 7.8 to 14.4% by volume. The latter value (14.4%) was obtained also in the California test, where the ratio of CO in the crankcase gas to the total CO in crankcase gas plus exhaust gas was 0.31%. The corresponding ratio for hydrocarbons, as obtained from the California test, was 31.0%.

58079

APTIC NO. 82181

TWO OPERATIONS GARAGES. (Deux opérations Garages). Text in French. Lab. Munic. Prefect. Police Paris no. 56.275 D/PA Part II:1-12, April 1967.

Two five and six floor Parisian garages were studied. The equipment for collecting exhaust is insufficient to assure evacuation of all the emitted exhaust to the outdoors, despite the existing mechanical ventilation. Engines with many cylinders exacerbate this condition. There is a serious amount of air pollution, up to 172 ppm carbon monoxide, in these work locations, which can lead to saturation of the mechanics and

thus, on a long-term basis, can constitute a health hazard. The peak CO levels are found in the afternoon and early evening. (Author abstract)

1966

58080

APTIC NO. 42557

Boyd, Alan S.

MASS TRANSPORTATION IN THE CITY OF THE FUTURE. Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 102-106. (Dec. 12-14.)

In national terms, urban transit is a declining industry. Each urban area must define its own mass transit needs. For some cities, perhaps mass transit should be free with expenses being met by an annual levy on nonresidential real estate. It would be foolish to create new urban transit facilities if people chose not to live in the cities; public opinion, therefore, should be consulted. In the future, each city's urban transit facilities will vary considerably. No single transportation scheme can fit all cities. There are opportunities to create new cities and new transit schemes. Any city's long range transportation planning which ignores social problems will be at the mercy of social problems.

58081

APTIC NO. 42560

Cisler, Walker

STATUS REPORT: HEAT AND POWER GENERATION. Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 120-123. (Dec. 12-14.)

About two-thirds of the electric energy for the U. S. is generated by solid fuel combustion. The generation of electrical power produces 12.5% of the pollution introduced into the atmosphere every year. Improved technology has solved some of the problems and is expected to solve the rest. The power industry is hampered by some of the exigencies of air pollution control. The multiplicity of governmental control agencies is criticized. Some emission standards are unrealistic. Meaningful, objective standards for emission control must be developed. Public funds are needed in the development of advanced designs for emission control and the desulfurization of coal and fuel oil.

58082

APTIC NO. 42565

Daddario, Emilio Q.

A CONGRESSIONAL VIEW OF THE PROBLEM. Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 183-187. (Dec. 12-14.)

The first requirement with which Congress challenges the technical community, primarily within the field of heat and power generation, is to describe and predict ecological parameters. Background measurements and an ecological survey must be provided. Continuous monitoring of the changes in the biosphere is needed to predict the consequences of man-made changes, detect the consequences, and know the environmental determinants of disease. Additional research and development can be provided as far as manpower, money, and facilities are concerned. What may not be within control is the necessary time to obtain the advanced technology for abatement. Early warning will require both the ecological and systems analysis know how. The potential for abundant energy exists along with the technology to convert energy from one form of fuel to another. All the facts needed for the optimum and wisest use of our energy resources, however, are still lacking.

58083

APTIC NO. 42546

Fitzpatrick, James V.

DISCUSSION: SOLID WASTE DISPOSAL PRACTICES AS RELATED TO AIR POLLUTION PROBLEMS.*Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 281-284. 1 ref. (Dec. 12-14.)*

Three million tons of refuse are generated annually in Chicago. Disposal accounts for 16,000 T of particulate emissions into the atmosphere every year. Municipal incinerators account for less than one-third of the total emissions while handling almost half of the solid waste. New legislation, new techniques, and the building of additional modern incinerators are imperative. Chicago is now planning two new incinerator plants. The design of a 1200 T/day plant employing a wet scrubber and an electrostatic precipitator is now planned. This combination should cut grain loading to 0.05-0.1 grains/cu ft at standard temperature and pressure. The additional cost will be approximately \$600,000. Many of the air pollution problems in the Chicago area are not common to other sections of the country, nonetheless what is learned should prove invaluable.

58084

APTIC NO. 42587

Goder, Richard

CONCLUDING REMARKS. *Public Health Service, Washington, D. C., Proc. Natl. Conf. Air pollution, 3rd, Washington, D. C., 1966, p. 352-353. (Dec. 12-14.)*

Air pollution within the solid waste disposal field is derived 1% from good incinerators, 2.5% from poor incinerators, and 35% from open burning. Solid waste disposal involves air, water, and natural resource dissipation. What was yesterday's waste may be tomorrow's energy. The combustible material now disposed of might be a fuel resource. Municipal incinerators can be developed to the point where particulate discharge of 0.035 lb/1000 lb of flue gas corrected to 50% excess air is achieved, producing an invisible discharge. There is still a problem, however, in the operation of incinerators. The cost of an incinerator providing a 50% increase in standards is doubled. This is out of proportion. The incinerator's built when there was a laxity of control were built to last and are the most serious problem at present.

58085

APTIC NO. 42589

Jackson, Walter E.

DISCUSSION: CONTROL OF AIR POLLUTION FROM INDUSTRIAL AND HOUSEHOLD INCINERATORS.*Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 339-341. (Dec. 12-14.)*

Although incinerators in Philadelphia release only 2.5% of the total air pollutants, they are responsible for 16% of the total reaction as expressed in community nuisance and property damage. Emission codes should be developed on the basis of lb emitted/lb charged. Emission test procedures must be evaluated and streamlined where possible. A nuisance evaluation should be part of each test. The cost/lb charged for small home units, when equipped with adequate control devices is greater than alternate disposal methods. Domestic and small industrial-commercial incinerators have not proved satisfactory in the urban Philadelphia area.

58086

APTIC NO. 42559

Lewis, Alfred

CONCLUDING REMARKS. *Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 115-117. (Dec. 12-14.)*

Motor vehicle control is the most critical phase of air pollution control. The job of educating 94 million drivers to the necessity for inspection and maintenance of control devices is a real social problem. Experience in California shows that control devices will work but need reliability over the life of the car.

Gasoline engines could not be phased out without damaging the economy. However, some of the burden must be taken off the private car and put on the mass transit system.

58087

APTIC NO. 42556

Ludwig, John H.

DISCUSSION: PRESENT APPROACH TO THE CONTROL OF MOTOR VEHICLE EXHAUST EMISSIONS.*Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 83-84. (Dec. 12-14.)*

The 13-year development period since the discovery of photochemical smog has been difficult within the vehicle emission control area. Many times new developments were made obsolete by later developments emerging from new technologies. These first generation controls are impressive but data shows that a national average reduction of 70% in all emissions is needed just to hold the line. The increase in cars on the road has overridden the controls. Hydrocarbon emissions are essentially the same and carbon monoxide emissions has risen 19% since 1961. The task of device inspection can be prosecuted most effectively at the state and local level.

58088

APTIC NO. 42567

Michaels, Abraham

SOLID WASTE DISPOSAL. *Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 611-612. (Dec. 12-14.)*

Some problems in solid waste disposal are reviewed. Although adequate technology exists, incinerators are generally not properly managed. Half of all the refuse disposed of is incinerated or burned in the open. Total contribution of refuse disposal to air pollution is relatively small, representing approximately 4% of the total nationwide pollution or 20% of the particulate emissions. Alternative disposal methods are available, but may cause other types of pollution. Most poor incineration can be updated, improved, or managed to meet present standards. Open burning, including the use of backyard trash burners, teepee burners, single chamber flue-fueled burners, and burning pits, should be abolished in all but isolated rural areas. Realistic incinerator regulations should be established and enforced. Continuous particulate measuring equipment should be developed. Management levels should be upgraded. The Solid Waste Disposal Act should be amended in the areas of Federal support to municipal agencies, incentives to industry, and research and development.

58089

APTIC NO. 42538

Moore, William W.

REDUCTION IN AMBIENT AIR CONCENTRATION OF FLY ASH-PRESENT AND FUTURE PROSPECTS.*Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 170-178. 12 refs. (Dec. 12-14.)*

Discussion of fly ash concentrations are limited to the combustion of oil and coal for generation of electric power, process steam, and space heating. Total generation of fly ash from all fossil fuel sources, before any collection, is expected to increase from 1960 levels of about 20 million T/yr to 32 million T in 1980, and 36 million T in 2000. Almost 75% of the fly ash generated in the next 40 yr will come from utility boilers. Total emission from utility boilers is at about 2.5 million T/yr. Although only 6% of the fuel used today is consumed in boilers 20 yr or more old, these units contribute 20% of today's stack emissions. Information on industrial boilers is meager. Industrial boilers probably emit 2.15 million T/yr. Residential and commercial use of coal contributes 1.7 million T/yr. Oil firing contributes only 3% from all three sources; emission of fly ash from all oil-firing totals 0.24 million T/yr. The future outlook depends on the efficiency levels specified for new installations and the rate of retirement or upgrading of present capacity. The overall bill in the next 34 yr to reach a goal of

EMISSION SOURCES

58096

one-fifth of today's fly ash emission will be about \$400 million, i.e., a little over \$11 million/yr and equal to 3 cents/yr/capita.

58090

APTIC NO. 42474

Mortstedt, S. -E. and N. Walde

REPORT ON A TRAVELS TO WEST GERMANY IN THE PERIOD FROM MARCH 23 TO 29, 1966. (Reserapport - Tysklandsresa 23-29.3.1966). Text in Swedish. Aktiebolaget Atomenergi (Sweden), Rept. BIL-1, BA-SSL-227, 10p., April 13, 1966.

Observations and experiences gained in the automotive emission area during travel to West Germany in 1966 are presented. The legislation on automotive emissions, which politicians and the auto industry expect to come into effect within the next 2-3 years, should be adjusted to a corresponding bill submitted in the USA. While cooperation with institutions in the USA is necessary, efforts are made to elaborate a simplified, uniform European cycle. There is no reason to apply instruments other than those recommended by the State of California Motor Vehicle Pollution Control Board. Exhaust emission measurements in city traffic were performed by means of a mobile laboratory. Problems of gasoline engine exhaust and of the pollution control by means of catalytic afterburning are studied. Infrared instruments and flame-ionization detectors are used for hydrocarbon measurements, while nitric oxide and nitrogen dioxide determinations, using semi-continuous instruments, are based on the ultraviolet light absorption of NO₂.

58091

APTIC NO. 42588

Ryan, William F.

A CONGRESSIONAL VIEW OF THE PROBLEM. *Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 342-347. (Dec. 12-14.)*

American cities are spending \$3 billion/yr for solid waste disposal. The daily toll in New York City alone is 32 Million lb of refuse; of this, 75% is paper, 10% is garbage, 8-10% is non-combustible, and 2-3% is demolition debris. About 35% is buried in landfills, 25% is buried in marine landfills, and 40% is incinerated. New York's municipal incinerators pour out 40 T of particulate matter into the air daily. The 11 major municipal incinerators are without air pollution control equipment. There are 18,000 smaller incinerators in apartment houses and other buildings. This is a disaster in solid waste disposal. The Solid Waste Disposal Act is not even an adequate first step since it provides no funds for construction of solid waste disposal facilities. The research program is far ahead of the implementation of recommended procedures but has no provision of Federal standards or action to ensure compliance. While annual damage in New York cost \$500 million, it would cost \$20 million to bring the incinerators into compliance with the city's own code. At \$2-3/person, 90% of the particulate emissions from incinerators could be eliminated.

58092

APTIC NO. 42591

Salvato, Joseph A., Jr.

DISCUSSION: THE THIRD DIMENSION: LAND POLLUTION. *Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 291-295. (Dec. 12-14.)*

The land inherits the solid wastes of urban society as well as the unwanted solid and liquid wastes resulting from air pollution control. County or regional areawide planning is the most efficient method for solid-waste collection, treatment, and disposal. Areawide consideration can help overcome the mutual mistrust that often hampers joint operations among adjoining municipalities. There is usually no more objection to one large-site operation than there is to each of several town, village, and city sites. The unit cost of disposal is less for large sites. Adequate funds are more easily obtained for areawide

service. The best site can be selected if many are available. Incentives under the Department of Housing and Urban Development 701 program are available for comprehensive community planning. A reasonable environmental pollution control balance can be achieved to obtain a healthful total environment for man.

58093

APTIC NO. 36378

Sullivan, J. L.

CONTINENTAL REPORT: AUSTRALASIA. *International Union of Air Pollution Prevention Associations, Intern. Clean Air Congr., Proc. London, England, 1966, p. 25-28. 6 refs. (Oct. 4-7, Paper II/5.)*

Air pollution in Australia and New Zealand is examined with respect to geography, state of industrialization, emission sources, effects on human health, air quality measurements, and legislation. Industrial plants, including chemical processing, oil refineries, metals and engineering works, and ceramic kilns, emit urban areas of Australia is discussed. Emission sources in New Zealand include animal products industries, timber and fertilizer production, and incineration of wood waste.

58094

APTIC NO. 42562

Udall, Stewart L.

THE DEVELOPMENT OF NATIONAL POLICY WITH RESPECT TO COAL AND OIL. *Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 128-130. (Dec. 12-14.)*

For a successful industrial society, the investment of more money, the establishment of higher standards of performance, and the acceleration of research and development are needed. Surveys reveal that people are ready to pay for clean air. The period of uncleanness in this country has been characterized by indifference and an unwillingness to believe in solutions to the problems. The transition periods for transportation and power generation do not need to be characterized by suffering. The electrical industry has shown more enlightenment to date than the automobile industry. The new interest in the electric automobile and in nuclear power generation is a sign of the times. The use of precipitators, reuse of fly ash waste, waste recycling, and re-siting of coal-fired plants are increasing.

58095

APTIC NO. 42590

Weston, Roy F.

DISCUSSION: FUTURE ALTERNATIVES TO INCINERATION AND THEIR AIR POLLUTION POTENTIAL. *Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 306-308. (Dec. 12-14.)*

Many municipalities and industries are looking to incineration to replace landfill for solid waste disposal. There is going to be a substantial increase in incineration. This need not be bad as long as source control is emphasized. Segregation, recovery, and utilization have significant potential for the future. However, the most economical solution for each local situation must be found.

58096

APTIC NO. 42549

Wilkenfeld, Jerome

CURRENT STATUS AND FUTURE PROSPECTS - CHEMICAL PLANT AIR POLLUTION CONTROL. *Public Health Service, Washington, D. C., Proc. Natl. Conf. Air Pollution, 3rd, Washington, D. C., 1966, p. 250-253. (Dec. 12-14.)*

The chemical industry has the technological capability to solve the air pollution problems incident to its own operations and is alert to opportunities for contributing to the progress in other fields of air pollution control as well. A very favorable record of performance in industrial hygiene is indicative of the industrial awareness and commitment. The very nature of the

products of the industry, some very toxic, has required the closest attention to safe working conditions during the industrial process. Chemical companies have invested \$212 million in air pollution control equipment with operational costs of \$24 million/yr. These companies plan to spend \$49 million on control hardware in the next 5 yr. Research is being undertaken on the odor threshold of various compounds. With cooperation on many levels of government and industrial chemical associations, the chemical industry strives to insure a clear social conscience.

1960

58097

APTIC NO. 82343

Malschaert, F. P.

THE DETECTION OF DIESEL ENGINE SMOKE. (*La detection des fumées des moteurs diesel*). Text in French. Aspects Tech. Securite Routiere Brussels, no. 3:1-72, Sept. 1960. 57 refs.

Three aspects of air pollution are discussed: the formation of smog, carbon monoxide emission by gasoline engines, and smoke emission by diesel engines. The soot in the smoke emissions is composed of particles, apparently spherical, which conglomerate to form flakes. Soot may carry the carcinogen, 3,4-benzopyrene. The literature is reviewed and detection and measurement of smoke is described, highlighting the Saurer, Bosch, Goode, Wachal, Schweitzer, Volvo, and Hartridge device. The Bosch and Hartridge smoke meters are described in detail. Correlation between meter readings is needed; correlations between the Bosch, Saurer, and Volvo meters, and also between the Bosch and Hartridge meters, are discussed. The effects of varied amounts of fuel upon power output of a motor, on wear, and on smoke emission are discussed. Statistical analysis of 5502 Hartridge smoke meter readings in Belgium is mentioned; acceleration of a disengaged motor and analysis of the smoke emitted was the technique used. (Author abstract modified)

1959

58098

APTIC NO. 35649

Hubbard, Albert B.

WINNING THE AIR CONDITIONING ODOR FIGHT -- ROUND 1: KNOW YOUR NOSE -- YOUR NOSE KNOWS. *Heating, Piping, Air Conditioning*, 31(1):138-139, Jan. 1959.

Odor problems connected with air conditioning systems are discussed together with the sense of smell and psychological effects of odors. In common with other senses, the nose has a threshold. Just below threshold concentration the observer is not aware of the odor; just above it he can smell and recognize it. Each odor has a different threshold concentration. With doors and windows open, an odor can remain diluted below the threshold. After air conditioning is installed, the odor is less dilute and thus discernible. Psychological effects on the sense of smell are olfactory fatigue, olfactory habituation, and odor obsession. No odor is universally acceptable because of different individual associations, prejudices, and inhibitions. For these reasons odor problems are not readily solved by masking undesirable odors with other odors. The nose is extremely sensitive and can sense some strong odors at less than one part per billion. The odors concentration must

AIR POLLUTION ABSTRACTS, JUNE 1976

double before the observer is aware of any change.

1958

58099

APTIC NO. 74253

Wurts, Thomas C.

INDUSTRIAL SOURCES OF AIR POLLUTION (4) - METALLURGICAL. *Environmental Protection Agency, Washington, D. C., Proc. Natl. Conf. Air Pollution, Washington, D. C., 1958, p. 161-164, 1959. (Nov. 18-20.)*

Sources of air pollution in the ferrous industries are discussed. The operation of two furnaces producing about 670 tons/day of ferromanganese results in over 100 tons of particulate matter that is collectible by electrostatic precipitators. Open hearth furnaces produce significantly less particulate matter in comparison with ferromanganese furnaces; eleven 300-ton open hearth furnaces equipped with electrostatic precipitators are estimated to produce a collectible particulate amounting to 30 tons/day. Blast furnaces can be controlled to meet a standard of 0.40 lb dust/1000 lb of gas, with approximately 1000 tons/day of dust being collected from furnaces with a capacity of 21,000 tons of pig iron/day. Auxiliary furnaces (soaking pits, heating and reheating furnaces, and the like) which are prolific producers of dense black smoke can be controlled satisfactorily by careful maintenance of the air/fuel ratio. The control of bessemer converters appears to be economically impossible; this type of steel producer, however, is rapidly disappearing. Design and operation modifications are being studied for the control of electric furnaces. Design improvements in coke ovens are responsible for significant reductions in emissions, although the operations of pushing and quenching require further improvement.

1955

58100

APTIC NO. 83013

Allan, D. L.

THE PREVENTION OF ATMOSPHERIC POLLUTION IN THE CARBON BLACK INDUSTRY. *Chem. Ind. (London)*, 1955:1320-1324, 1955. 6 refs. (Presented at the Prevention of Atmospheric and Water Pollution in the Chemical Industry Symposium, London, United Kingdom, April 4-5, 1955.)

Smoke particles are made deliberately in carbon black production, and must be separated from the gaseous medium in which they are suspended. The methods used for such collection, their efficiency, and as a direct consequence, the degree of atmospheric pollution, vary with the mode of production and the geographical location of the plant. The primary carbon black particles are agglomerated before entering the recovery system proper. Carbon black is then collected by two or three cyclones; together, they have a recovery efficiency of 90 to 95%. The remaining carbon is removed either by water-scrubbing followed by wet electrostatic precipitation, or by bag filtration. The gases discharged from the bag filters or the wet electrostatic precipitator, although virtually free from carbon black, nevertheless contain hydrogen sulfide. This does not exceed 1 grain/cu ft and is disposed of by combustion. The heat release, though low, can be utilized for preheating feedstock and steam raising. The few minor sources of contamination associated with the handling of carbon black after its separation from the gas-stream are being progressively eliminated. (Author abstract modified)

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